

SONORAN

QUARTERLY

SONORAN
QUARTERLY
80TH CELEBRATION

VOLUME 73 No. 1



DESERT
BOTANICAL
garden

80 YEARS YOUNG

This special edition of the *Sonoran Quarterly* marks the 80th anniversary of the Garden and, on behalf of all involved, I can assure, you creating this publication has been a labor of love. The only difficult part was selecting from among all the stories—those representing the Garden's past, present and future—which to include in these pages.

As you read on, keep in mind that the Garden's own history and future are inextricably linked to those of Arizona and Phoenix. When the Garden was created in 1939, Arizona had been a state for only 27 years, and Phoenix was a young city with a population of just 50,000 people. Virtually everything was new back then and—in a very real sense—the state, City and Garden have grown up together in the last 80 years. Phoenix is now the fifth largest city in the nation, and Arizona is one of the fastest growing states. Following a similar trajectory, our Garden has transformed from a well-respected regional attraction to its current stature as a leading public garden in the nation.

And while growth and change have shaped who we are in the last 80 years, one thing has remained constant since the Garden's inception, and that is our mission. We have been dedicated to saving the unique natural heritage of Arizona since our very first day through research, conservation, education and the exhibition of desert plants. And this very same mission will be our touchstone for how we shape the future for the next 80 years.

In the pages that follow, you will come to know the Garden better. We present feature articles about the Children and Family Garden we will build in the future, the vision and leadership so many women have provided since the beginning of the Garden, the renowned artists whose works have been presented at the Garden, and understanding the important role that the Conservation Alliance of Central Arizona and our Regional Open Space Strategy will have in shaping a healthy future for Arizona and all its residents—plants and people alike.

I hope you enjoy reading this issue and that you will take pride in knowing you are part of this amazing history. It is your friendship and support that make possible everything we do.

With gratitude,

Ken Schutz

Ken Schutz
The Dr. William Huizingh Executive Director



THE GARDEN IS
HERE TO HELP YOU
THE BEAUTY OF
THE DESERT AND
ABOUT IT.

SONORAN QUARTERLY

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80 YEARS IN
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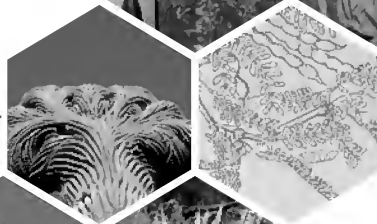


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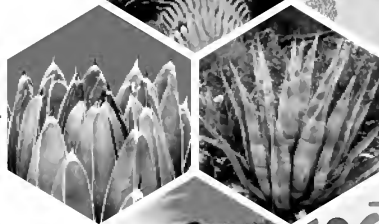


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WE WOULD LOVE TO HEAR YOUR FEEDBACK ABOUT **SONORAN QUARTERLY**. SEND US A MESSAGE VIA EMAIL AT SQ@DBG.ORG.

SHELLY ALAM & WENDY HODGSON

DANA TERRAZAS

GARDEN
SPOTLIGHT

Between the Garden's two longest-serving employees, their time here almost equals our 80 years of existence. **But their dedication, passion and love for the Garden certainly continues to grow.**

Meet Shelly Alam, accounts payable. Shelly began his career at the Garden 31 years ago and has held eight roles from admissions and maintenance to ranger and finance. Shelly truly has done it all at the Garden, recounting his stories of taking wedding photos, setting up concert lights and using his architectural skills to draft plans. Shelly has dedicated his time to 60 Plant Sales and 30 Luminaria events.

“Every day I am proud to be here. I am so fortunate and happy to work at a great place with the nicest colleagues and volunteers,”

he says.

His fondest memory was in 1999 when he officially became a U.S. citizen, and the next day he got to raise the flag. Then executive director, Dr. Robert Breunig, saw Shelly doing this and stopped him, shook his hand and gave him a hug.

Thank you Shelly for your service. The Garden would not be the same without your smiling face and positive spirit.



Meet Wendy Hodgson, herbarium curator emerita and senior research botanist. Wendy began her time at the Garden 45 years ago as a research assistant and illustrator for Howard S. Gentry. Since then, she has worked tirelessly, documenting and investigating plants throughout the Southwest, especially within Grand Canyon National Park and along the 800-mile Arizona Trail, as well as studying agaves domesticated by pre-Columbian cultures.

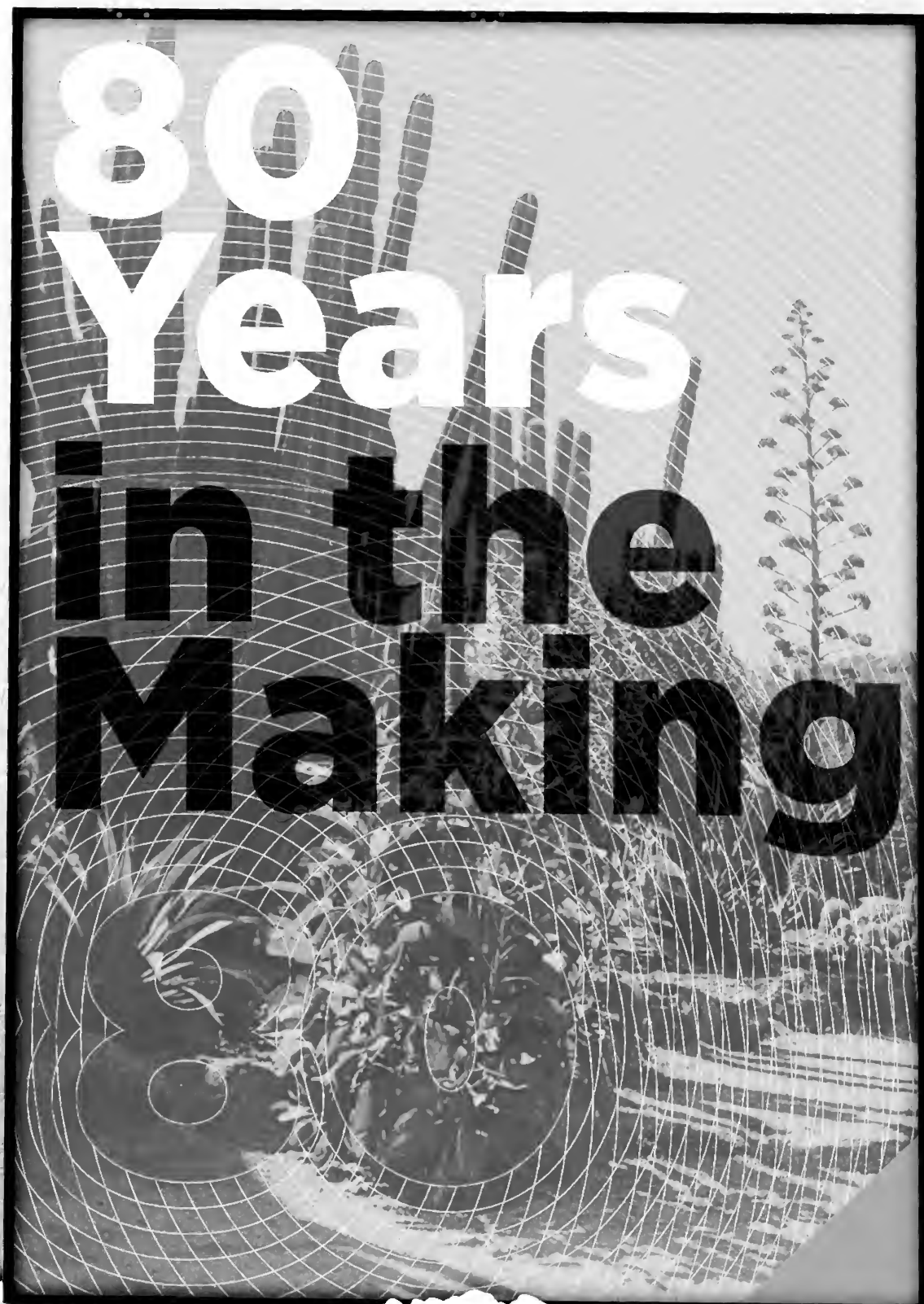
“The Garden allows me to do what I love best—research and field work. I am very proud of what a small, dedicated group of staff and volunteers did with limited resources, laying a strong foundation, from which we could build on today and in the future.” Hodgson says,

Thank you Wendy for your dedication to the Garden, desert plant research and conservation and for generously sharing your love and knowledge of desert flora.



By Clare Hahne

80 Years in the Making



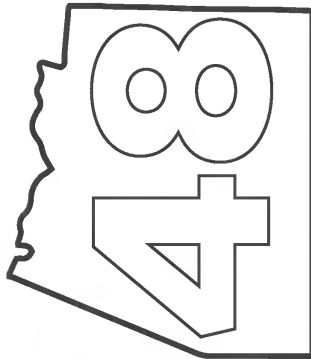
1868

Phoenix is officially recognized as a city.



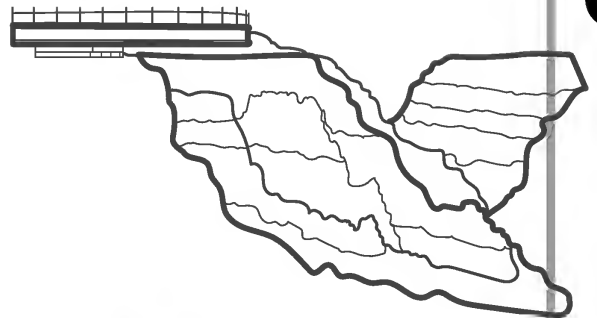
1912

Arizona becomes the 48th state.



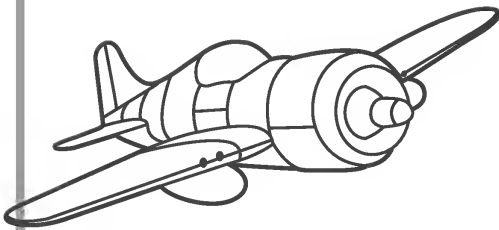
1919

Grand Canyon is named a national park.



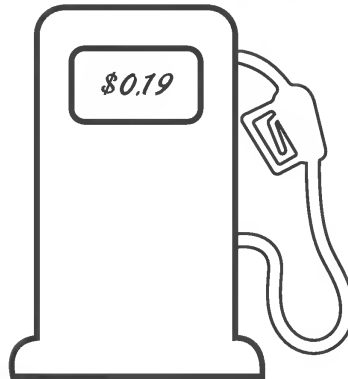
1941

Attack on Pearl Harbor occurs.



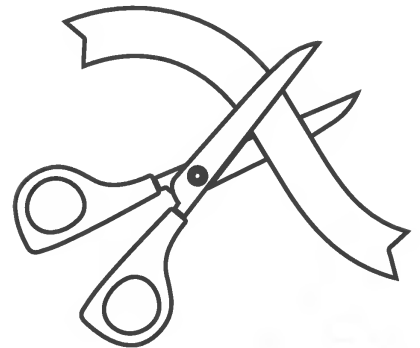
1939

Gas is \$.19 per gallon.



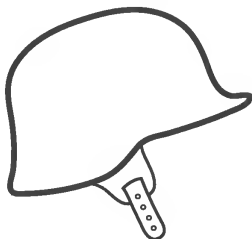
1939

The Garden opens its doors to the public.



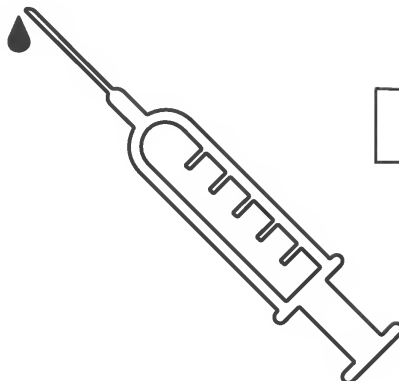
1942

World War II brings most Garden activity to a halt. Arizona State Teachers College, now Arizona State University, provides administrative oversight while volunteers work to sustain the fragile collections on site.



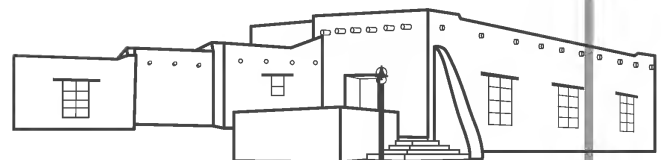
1942

The first person is treated with penicillin.



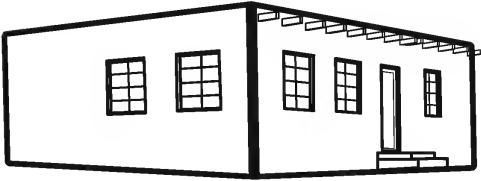
1947

Garden founder Gertrude Webster's legacy gift is realized, in support of the Garden.



1952

Archer House is built and named in honor of Lou Ella Archer, a founding member who contributed time and talent to early fund drives.



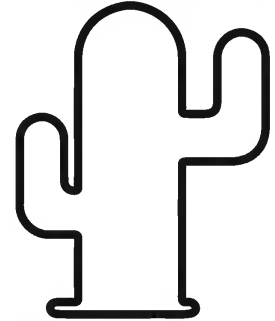
1955

Rosa Parks refuses to give up her seat on a Montgomery bus.



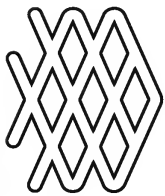
1957

Under W. Taylor Marshall's leadership, the Garden's collections increases from 1,000 specimens at the end of World War II to more than 18,000 specimens.



1984

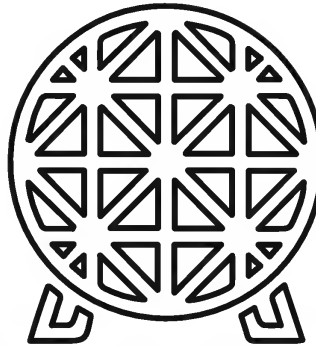
The American Association of Museums accredits the Garden. Only 24 gardens have earned this distinction.



American
Alliance of
Museums

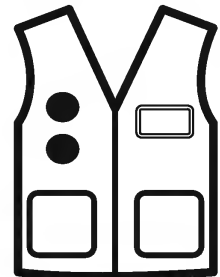
1982

EPCOT opens at Walt Disney World.



1977

The Docent Program is established as part of the Education Department to provide guided and informative tours.



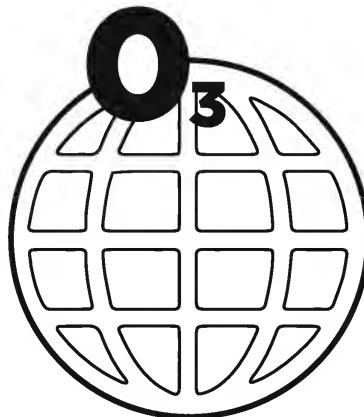
1985

Desert Botanical Garden becomes a charter member of the Center for Plant Conservation—a consortium of botanical gardens devoted to preserving rare flora of the U.S.



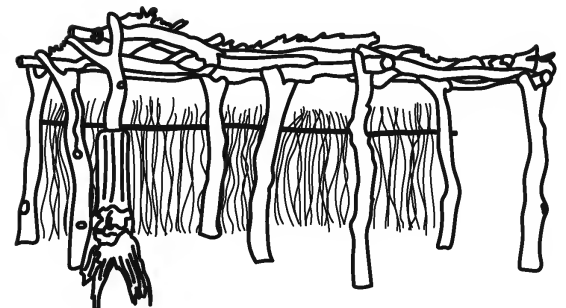
1985

Hole in the ozone is first reported.



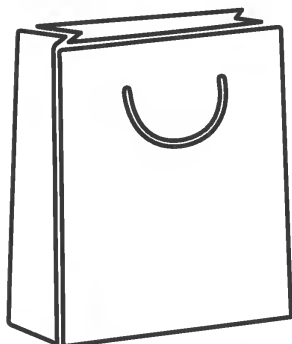
1988

Plants and People of the Sonoran Desert Loop Trail opens.



1961

The Visitor's Reception Building and Garden Shop are added.



1963

A new paved road, later named Galvin Parkway, opens and provides direct access to the Garden.



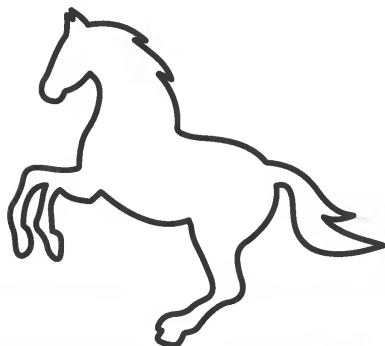
1963

Dr. Martin Luther King Jr. delivers his "I Have a Dream" speech.



1972

Secretariat races into hearts by snagging the Triple Crown.



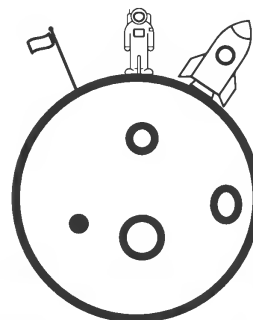
1970

The first Garden library is built to house a valuable donation of rare books and prints.



1969

United States lands the first people on the moon.



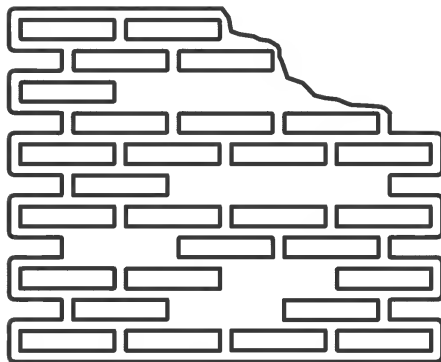
1989

The proposal for the World Wide Web is published.



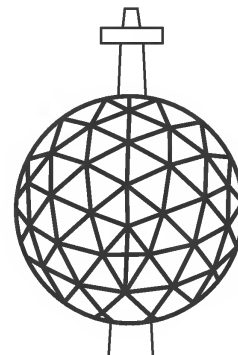
1991

Berlin Wall is brought down.



2000

The world rings in the new millennium with excitement and relief that the Y2K bug did not come to fruition.



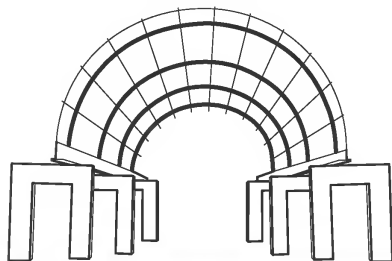
2002

Garden completes a \$17 million expansion, which includes a new entry and admissions area, the Garden Shop and sales greenhouse, *Dorrance Hall*, a 400-seat reception hall and gallery, the *Nina Mason Pulliam* Desert Research and Horticulture Center and the *Harriet K. Maxwell* Desert Wildflower Trail.



2008

Part of the \$17.8 million campaign helps transform old Cactus and Succulent Houses into *Sybil B. Harrington* Cactus and Succulent Galleries and opens *Ottosen* Entry Garden.



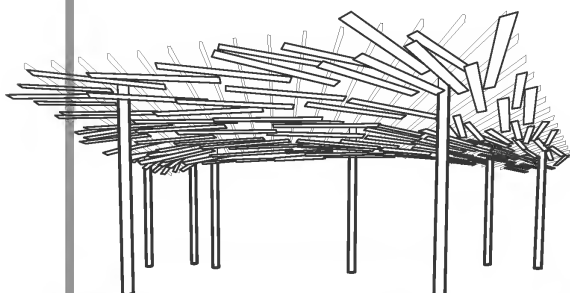
2008

Dale Chihuly's glass sculpture exhibition draws more than 500,000 people to the Garden.



2015

The *Virginia G. Piper* Desert Terrace Garden and the *Jan and Tom Lewis* Desert Portal open.



2014

Malala Yousafzai becomes the youngest recipient of the Nobel Peace Prize for her work toward education for all children.



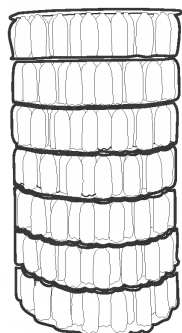
2014

The Garden celebrates its 75th anniversary and launches *The Saguaro Initiative*, a fundraising campaign to invest in the future of the Garden.



2015

Desert Botanical Garden presents its first-ever nighttime only exhibition—the large-scale light installations of Bruce Munro.



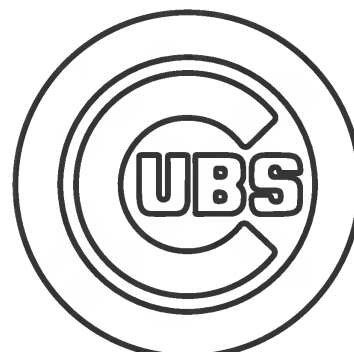
2015

International Union for Conservation of Nature announces cactus is among the five most threatened groups of living organisms.



2016

After 108 years, Chicago Cubs finally win the World Series, unifying fans and non-fans alike.



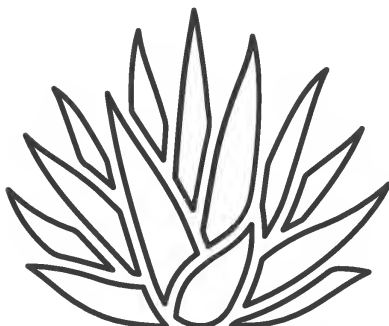
2008

Barack Obama is elected the first African American U.S. President.



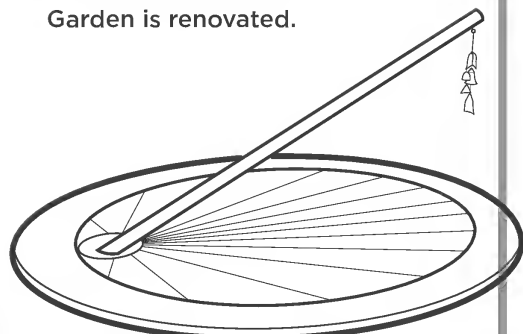
2009

Berlin Agave Yucca Forrest opens.



2010

Center for Desert Living Trail, including the *Steele* Herb Garden is renovated.



2013

Dale Chihuly's glass sculpture returns to the Garden for the second time—this time attracting more than 600,000 guests.



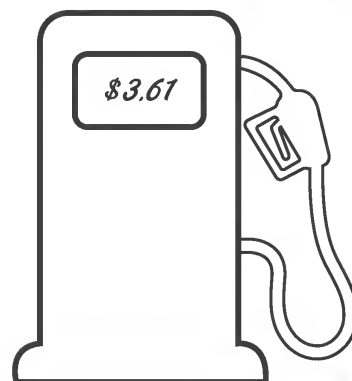
2012

Central Arizona Conservational Alliance is formed to study, protect and promote the Valley's mountain park preserves.



2012

Gas is \$3.61 per gallon.



2017

New Butterfly pavilion and *Hazel Hare* Center for Plant Science open.



2018

Desert Botanical Garden opens **Electric Desert | A Light and Sounds Experience** by Klip Collective.



2019

Desert Botanical Garden celebrates its 80th Anniversary.





FEMININE



NATURE



NORA BURBA TRULSSON

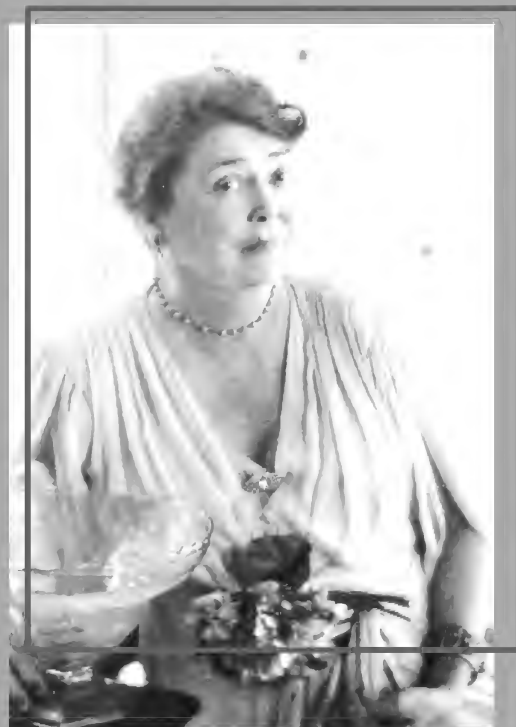
*Through the years, **STRONG WOMEN** have shaped Desert Botanical Garden.*

More than ever, women and the women's movement have been in the headlines, but at Desert Botanical Garden, women have always been important in shaping the Garden's form and future. From its founder and an executive director to its dedicated cadre of indefatigable volunteers, women have helped the Garden grow. Here are just a few of the ladies who launch.

GERTRUDE DIVINE WEBSTER

The Garden's founder, Gertrude Divine Webster, was no shrinking violet. Fond of smoking small cigars and wearing heavy perfume, Illinois-born Webster married and divorced well, negotiating millions of dollars in a settlement—not to mention half the liquor—when she divorced in 1922, according to research done by Garden volunteer Ron Lieberman. The money allowed Webster to pursue her interests, including building a winter home in Phoenix at the base of Camelback Mountain in the late 20s and engaging in land speculation in what is now the Arcadia neighborhood. After purchasing some rare cactus, she came in contact with Gustaf Starck, a self-taught botanist and founder of the Arizona Cactus and Native Flora Society, whose ambition was to start a botanical garden dedicated to

plants of the desert. The rest, they say, is history. Webster joined the society and enthusiastically took on the cause of launching the garden, recruiting Phoenix movers and shakers to the cause, donating her own money and plants, and enlisting Charles Gibbs Adams, a landscape architect, to design the site at Papago Park. Webster also hired the Garden's first director, George Lindsay, and helped fund the Garden's first building, the Pueblo Revival-style Webster Auditorium, which is still in use today. She oversaw the Garden's opening in 1939, but ill health in the ensuing years confined her to her Camelback home. She passed away in 1947, at the age of 75.



WENDY HODGSON

When she's not at the Garden, it's likely you'll find Wendy Hodgson backpacking through the Grand Canyon and the rest of Arizona, in pursuit of its flora. The New York native and avid plant collector has the perfect job—she's the Garden's herbarium curator emerita and senior research botanist, who has personally collected some 32,000 of the herbarium's 89,000 specimens. Initially hired as an illustrator, Hodgson came to the Garden in 1974, armed with a freshly minted ASU bachelor's degree in wildlife biology. The job soon morphed into a little bit of everything, with Hodgson driving tractors and putting up fences before being encouraged to go out into the field to find and collect plants for the herbarium. This led to her pursuing and receiving a master's degree in botany in 1982. Hodgson, though, isn't always out in the desert

with a knife and a notepad. She's also an adjunct professor of conservation biology at ASU and has authored "Food Plants of the Sonoran Desert" (2001, University of Arizona Press), which won a Klinger Book Award given by the Society for Economic Botany. More recently, in conjunction with fellow curator and researcher Andrew Salywon and Archaeology Southwest, she was instrumental in discovering a new species of domesticated agave—*Agave sanpedroensis*—in Southern Arizona, cultivated by ancient farmers.

"Being a scientist is a humbling profession," Hodgson says. "I feel so lucky to have stumbled into my passion."



CAROLYN POLSON O'MALLEY



One night when Carolyn Polson O'Malley was first working at the Garden, she left her office late, meandering down a path illuminated only by a full moon. "I leaned down to pick up a hose off the path," recalls the Garden's former executive director, "and the hose moved. I quickly learned it was Connie, the king snake." O'Malley didn't know much about botany (or reptiles, for that matter) when she first came to the Garden as assistant director in 1994, but she did have a strong background in volunteer work and management. The Phoenix native earned her master's in international management from what is now the Thunderbird School of Global Management, lived overseas for many years and had a background in nonprofit management before joining the Garden. During her tenure, the Garden grew substantially,

thanks, she says, to a strong staff, volunteer group and board, plus a capital campaign that resulted in the funds to construct *Dorrance Hall*, the *Marley Education and Volunteer Building*, the *Nina Mason Pulliam Desert Research and Horticulture Center* and other facilities. Since leaving the Garden, O'Malley served as executive director of the *Dorrance Family Foundation*—from which she recently retired—and has remained an active volunteer, serving as a member of the Board of Trustees and on many boards.

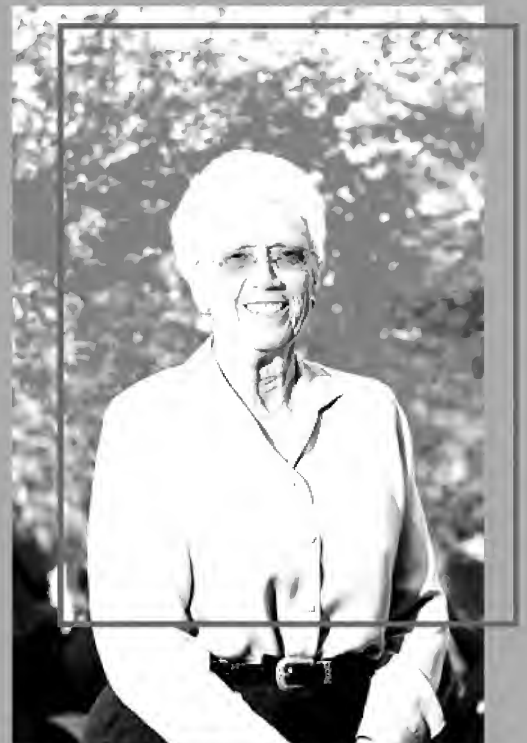
"I was so lucky to have worked at the Garden," she reflects. "It's a magical environment that captured my heart."

HAZEL HARE

Hazel Hare had a love of learning. It's a quality that served her well when curiosity about desert plants led her to involvement at the Garden in the 1970s and a desire to figure out ways to help the organization steered her toward joining the Garden's board of trustees in 1994. Hare was born in Brooklyn in 1931, says her niece, Tracey Kane, and received a degree in chemistry from Montreal's McGill University. In the 1950s, she married Donald Hare, who founded a California manufacturing company that specialized in television broadcasting and sound equipment. When the company was sold in the 1970s, the Hares took up flying, which landed them in the Phoenix area for the favorable aviation weather.

"My aunt was unfamiliar with desert plants when they first moved here," recalls Kane. "So she took a class and fell in love with the Garden." Hare threw herself into work for the Garden, joining committees, spearheading a capital campaign that raised millions of dollars and generously donating (always anonymously) her own money to help causes. She also became active in other organizations, including the Arizona Science Center. Hare passed away in 2016. The Garden's *Hazel Hare Center for Plant Science* is named in her honor.

"She would never accept recognition when she was alive," says Kane, "but she was an active 'doer.' She deserves to be recognized for what she did."



HELEN WOODEN

For years, volunteer Helen Wooden was a fixture at the Garden, tooling around the winding paths on her scooter and chatting up guests, imparting her love of the desert and its plants.

“Helen was our “rolling ambassador,” recalls Ken Schutz, the Garden’s executive director. “We often received notes and letters from visitors who told us how much they enjoyed talking to her.” Born in Ohio of Hungarian descent and raised on a farm during the Depression, Wooden contracted polio as a youth, but never let that slow her down. According to Schutz, she worked as a teacher in Ohio, then took a bus to come to Phoenix, seeking sunshine and adventure. She had a career teaching elementary school

in the Phoenix area and in Superior, married and raised a family. After her husband passed away, Wooden joined the Garden in 1999, driving herself in a van specially equipped for her scooter and never letting her disability affect her fierce independence and love of the desert, which she shared with everyone. “She was here almost every day,” says Schutz. “She was an institution.” After Wooden passed away in 2015, with the support of her family, the Garden erected a memorial bench in her honor, located in the *Kitchell Family* Heritage Garden—one of her favorite spots.



CARMEN DE NOVAIS GUERRERO



Carmen de Novais Guerrero usually works behind the scenes, where she has curated the annual Día de los Muertos Celebration weekend at the Garden for the past 14 years. She reaches out to local artists to create the ofrenda, or offering altars, and to local performers who engage audiences with storytelling, music and dance that tell the story of the Latino Day of the Dead traditions. But beyond her work at the Garden, Guerrero is a cultural polymath, someone who is well known and well connected to the Valley’s art scene. She’s a musician who studied piano at Oberlin College and also plays guitar and accordion, an organizer who puts together festivals around the city and an artist who handcrafts beaded jewelry inspired by traditional motifs of her native Brazil. She’s also part of an artistic family, married to Zarco Guerrero, a sculptor, performance artist and fellow musician (their Latin-Caribbean band,

Zum Zum Zum, was a popular fixture in Arizona during the 1980s and ‘90s), and mother to three children, who are also artists and musicians.

“We have a commitment to the community,” says Guerrero of her work, and her family’s efforts to bring art and culture to the Garden. “The Garden is ancient ancestral land. It’s an inspirational and beautiful place for us.”

ROO IN HISTORY

EIGHT OF THE GARDEN

CLARE HAHNE

Strolling through the Garden's trails, each plant has characteristics that stop visitors in their tracks to explore their intricate and odd details. Each one offers clues into how these hardy specimens have evolved to survive a harsh desert climate.

One of the most frequently asked questions we receive is about the age of our plants. The short answer is that it just depends, but there are a handful of plants which have been around since the Garden opened 80 years ago and continue to thrive to this day. Take a look at some of the Garden's living legends.

THE

S M O S T I C O N I C P L A N T S

1

CREEPING DEVIL

Walking just north of *Webster Auditorium*, it is easy to overlook the first accessioned plant in the Garden's collection. Look down to see the *Stenocereus eruca*, or creeping devil, which was originally planted in 1939 with the Garden's opening. Today it has grown more than 45 feet from its original planting site.



2

CRESTED SAGUARO

One of the most bizarre looking plants in the Garden's collection, it is hard to miss the top of the saguaro cactus on the Plants and People of the Sonoran Desert Loop Trail. There are only a few thousand crested cactus found in nature. The Garden has several crested cactus, but this is one of the most recognized.



3

CARDONS

Perhaps some of the most photographed cactus in the Garden, *Pachycereus pringlei*, or cardons, stand tall just north of Webster Auditorium. These towering cactus giants were only 4 feet tall when they were first planted, but today the tallest arm is more than 35 feet tall.



4

BOOJUM

Fouquieria columnaris, or boojums, capture the attention of visitors due to their odd shape. Unlike other plants that drop their leaves in the fall to prepare for the winter, boojums drop their leaves in the spring to prepare for harsh summer elements. The Garden has two, which have survived since the early years.



5

ORGAN PIPE CACTUS

The oddly breathtaking views of the Organ Pipe Cactus on the Sonoran Desert Nature Loop Trail don't just make for a great photo op. They also have a fascinating story. These cactus were rescued from Cornelia Mine in Ajo, Ariz. The first batch arrived in 1940, and the second came in the 1980s. While the trail has provided a comfortable home for these rescues, the cactus have become one of the most photographed parts of the Garden.



CHILEAN PALO VERDE



An odd Chilean Palo Verde, or *Geoffroea decorticans*, grows near the south side of Quail Run, which appears to be growing sideways. That is because it is. During the monsoon season of 2014, the tree fell as a result of a storm. The Garden's horticulture team took meticulous care to save the tree by pruning it back and submerging the roots again. The tree has continued to thrive thanks to the expertise of Garden staff.

6

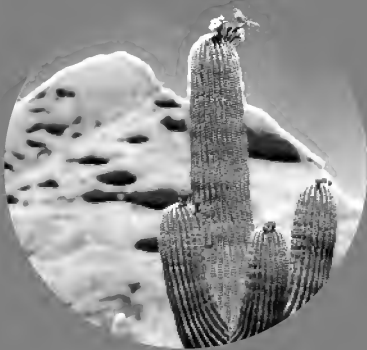
ELEPHANT TREE



In the north plant bed near *Webster Center*, there stands an Elephant Tree, or *Pachycormus discolor*, which was collected and brought to the Garden in 1939 by the first director. This tree has grown 15 feet during its life in Phoenix.

7

SAGUAROS



The Garden takes inventory of all saguaros on the premises and is home to 1,037 as of 2018. The tallest saguaro in the Garden measured in at 29 feet, but each year, the Garden finds new baby saguaros growing. One of the most frequently asked questions staff and docents are asked is how old a saguaro is. It takes 50 to 70 years for them to start growing arms, but they can grow more than one arm at a time.

8

From
SAGUAROLAND
to
SONORAN
QUARTERLY

1947 - PRESENT

*Beth Brand
& Amber Ramirez*

By 1947, the War had ended, and the Garden reopened to an uncertain fate. What was it like back then and who was here to see the Garden through? Thankfully answers to those questions and more can be found in historic Garden member publications.

We know it now as *Sonoran Quarterly*, but in June 1947 the Garden's first newsletter went to print unnamed with a conspicuously empty masthead. It wasn't until the second issue that the title *Saguaroland Bulletin* appeared. The name was the brainchild of Reg Manning, a prominent artist and illustrator for *The Arizona Republic*, who later won a Pulitzer Prize for one of his editorial cartoons. Manning submitted the title as part of a Garden member contest to name the new publication. He also created the distinctive saguaro-themed art, which graced the cover for 26 years. As the Garden grew, the publication's cover and format evolved

and in spring of 1991 was completely reinvented by new editor, Carol Schatt (now Schilling). She suggested its current name, *Sonoran Quarterly*, and established a fresh, new style. For more than 14 years she volunteered her journalistic talents, sharing news and inviting readers to the Garden with every issue.

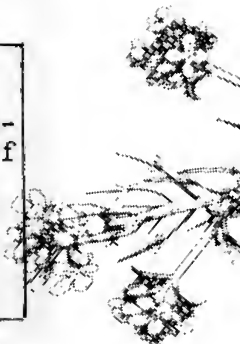
In honor of the Garden's 80th anniversary, below is an original excerpt from the first mimeographed bulletin, dated June 1947. Also included are excerpts from the Feb. 12, 1939 dedication of the Garden printed in *Desert Plant Life*.

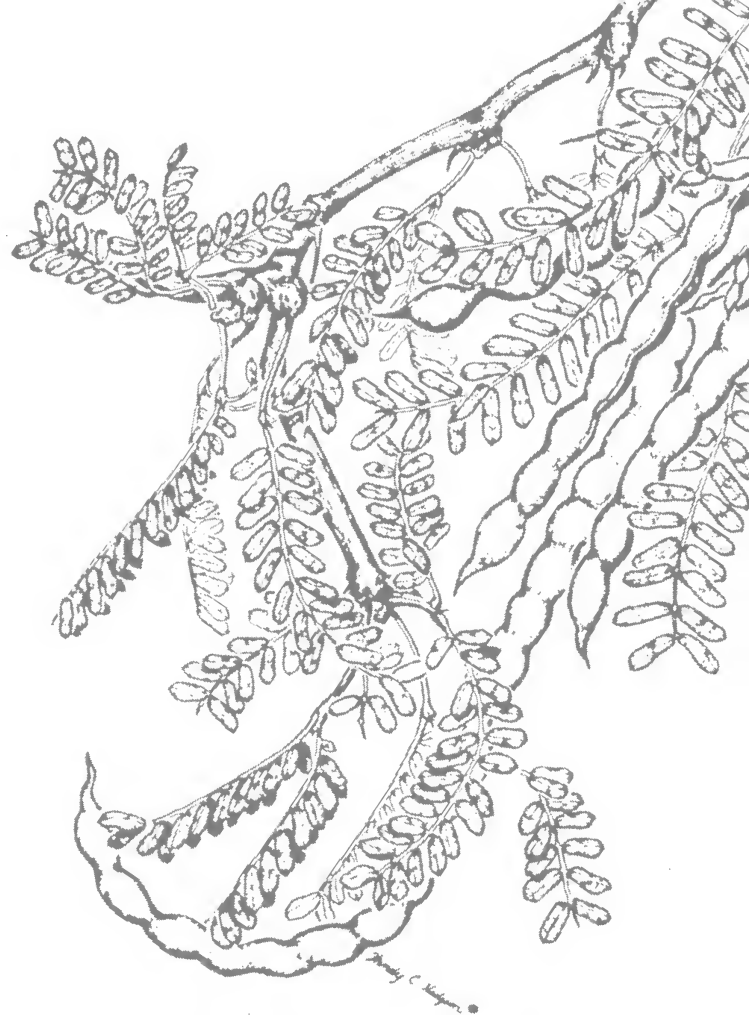
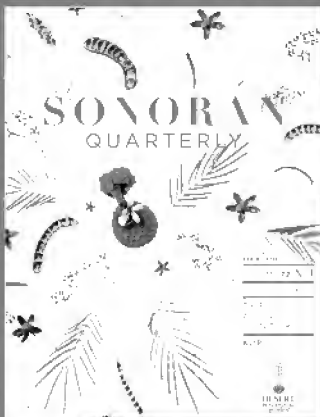
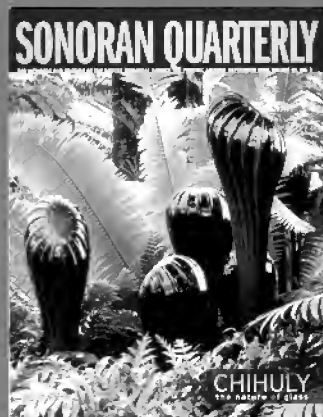
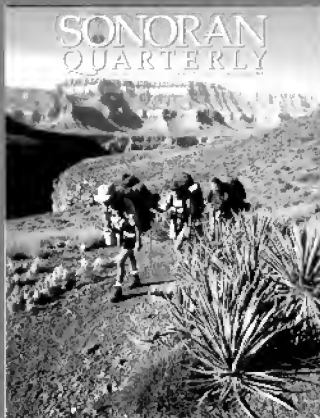
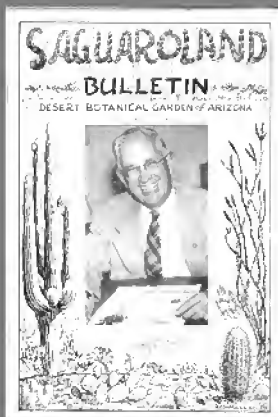
To view issues of the *Saguaroland Bulletin*, *Sonoran Quarterly* and another of the Garden's publications, *Agave Magazine*, go to the Biodiversity Heritage Library online at <https://bit.ly/2AXEOEr>.

As Director of the Garden, Marshall has two principal responsibilities: first, to conduct a "popular" program in keeping with the Garden's aim of being of public service; and second, to further the cause of science with a technical program of research and study. One is no more important than the other, and in various stages they interlock inseparably or divide without compromise. To administer them fairly and keep harmony at all times will take considerable skill and ingenuity, and to date Mr. Marshall has demonstrated that he has this talent. The Garden has a great future in store, and we wish Mr. Marshall good luck and many happy days.

CONTEST

This bulletin needs a name, and we are leaving it up to the members in the way of a contest. The prize-winning name will win one of the books listed on the Book Department page and will appear on the cover of next month's issue. Send as many names as you like to the Editor, who welcomes any comments and suggestions at any time but promises nothing as a vigorous correspondent. Contest dead-line is June 23rd. Would like some voluminous response to this. Ed.





DESERT PLANT LIFE

ELEVENTH YEAR

NUMBER TWO

CERTRUDE D. WEBSTER
Phoenix, Arizona

Arizona Desert BOTANICAL GARDEN

Every citizen of Arizona should feel that today he has received a great gift. Here around us are 800 acres, which we are consecrating with thankfulness, to beauty and education.

Through the Arizona Land Board and the Fish and Game Commission, the Cactus Society will have the happy privilege of developing a Desert Botanical Garden on these grounds.

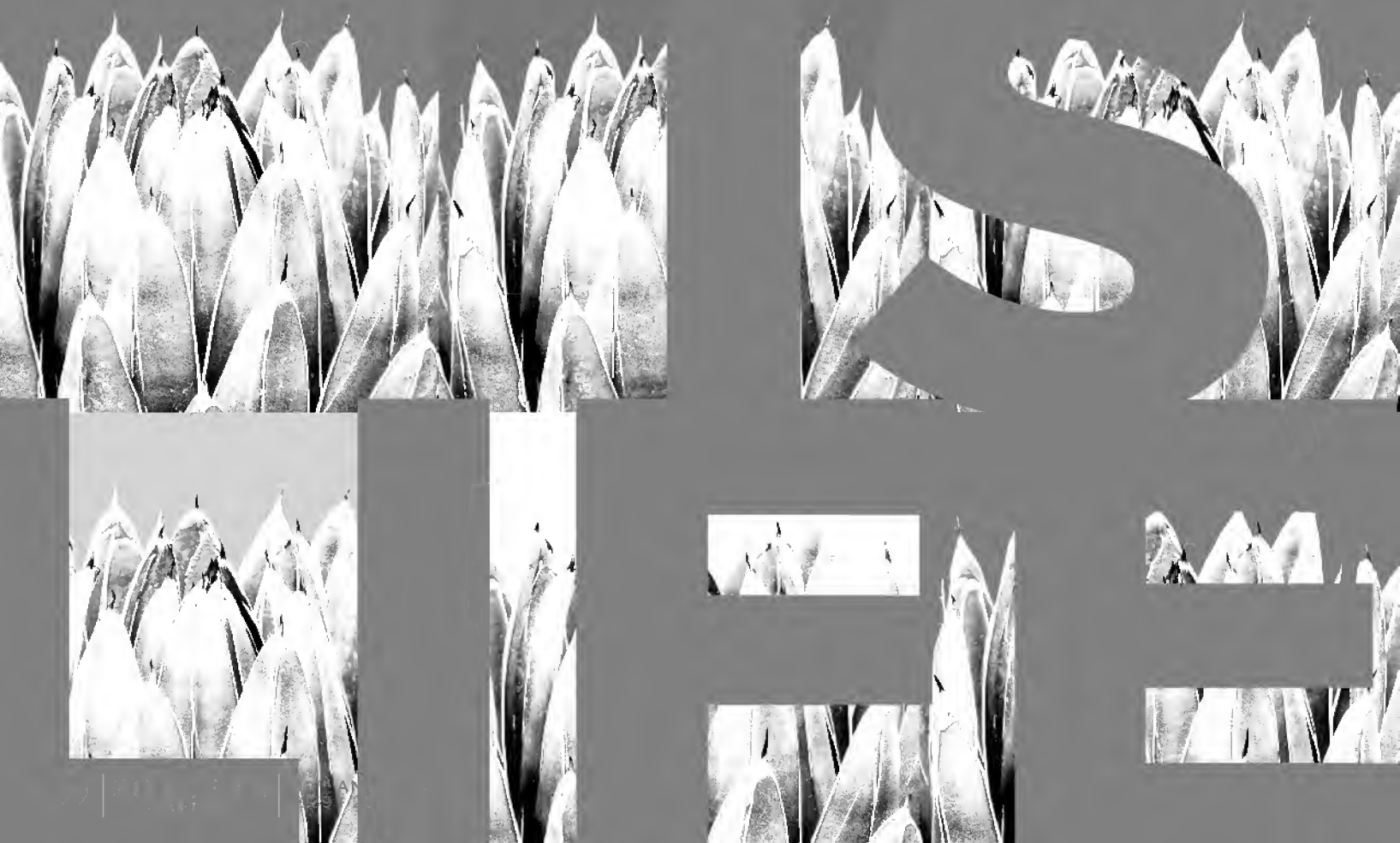
There are Botanical Gardens all over the world; but nowhere a garden concentrating on arid and semi-arid plant life—and never has there been such an interest as at present in the Cactus family and desert plants.

Our purpose is threefold—First, we wish to conserve our Arizona desert flora—fast being destroyed; second, we wish to establish scientific plantings for students and botanists, and third, we wish to make a compelling attraction for winter visitors.





DR. KIMBERLY MCCUE



Agave is actually the scientific name for the genus that includes all plant species we know as agaves. Sometimes they are called the “century plant” for many species’ habit of living as beautiful, rosette formed plants for years and often decades before flowering for the one and only time in their life. No matter the name we use, agaves are diverse, widespread and function somewhat like the buffalo did for native peoples of the Plains of the U.S. From agaves, humans extract fiber to make rope and textiles, make sweet delicious food through roasting and produce many types of drinking alcohol (yes, we are talking tequila, mescal and more). In some cultures, agave was and is used for medicine and in many ceremonial practices.

So much good from a single group of plants, yet not all agave species are safe and secure from threat. Many researchers, including many at the Garden, are aware of agave species that are rare, threatened or in decline. But, it is difficult to make conservation plans without having a full understanding of which species are the most threatened and what the major threats are. This is why in 2018 the Garden collaborated with the International Union for Conservation of Nature (IUCN) to bring the world’s agave experts together and one by one assess the conservation status (how secure or threatened) of each species of agave. We shared the story of our plans for this assessment in the *Winter Sonoran Quarterly* 2017. Now we can share some of the findings from that work.

In February 2018, 28 scientists, including three from Desert Botanical Garden, traveled to Querétaro, Mexico, to meet for a week to share their expertise and assess the status of most of the known agave species in the world. Mexico was chosen as the site for this meeting because of the high diversity of agave species in the country and the number

of experts in Mexico or other nearby countries. Everyone was eager to get to work, and work they did. From morning to evening, seated around tables, groups focused on agaves that occur in specific geographic regions. Equipped with laptops and cell phones for consulting scientific papers and other references online, maps of species documented locations, and applying first-hand knowledge and years of experience in the field, one by one the team assembled information and assessed the conservation status of each species.

The assessments are not arbitrary but follow strict protocol and adhere to IUCN’s Red List categories and criteria. The categories a species may be placed in range from Least Concern to Extinct in the Wild. In some instances a species may not be evaluated or be deemed “Data Deficient” (not enough information to make a valid assessment). In the saddest of cases, a species may be determined to be extinct.

The end of a Red List assessment workshop is not the end of the work. Not all experts are able to participate in person. These people are brought into the process after the workshop as reviewers of the assessments. Some species cannot be assessed at all until experts not in attendance can share their expertise after the fact. In addition, all assessments must go through a final review for completeness and consistency before being published to the online Red List database. Once published, anyone in the world with internet access can access the assessments, see what species are endangered, which are of least concern, and read all the relevant information about individual species.

At this writing, the final review process of the agave assessments is still underway. However, some general preliminary results are shared here. The best category for any

species to fall into is Least Concern, and nearly half of the species of agave that were assessed are fortunately in this category. A small number of species have been assessed as Near Threatened, a category for species that don’t quite meet the criteria for Vulnerable. Nearly 20 percent of species were assessed as Vulnerable, meaning there is a risk they will become endangered. About 10 percent of species met the criteria of Endangered, having a high risk of extinction in the wild. Another 10 percent of the species assessed are initially placed as Critically Endangered, having an extremely high risk of extinction in the wild.

Assessments are only the beginning for conservationists. With knowledge in hand, we can begin to prioritize where conservation action is most needed and what type of action may be required to prevent the loss of species.

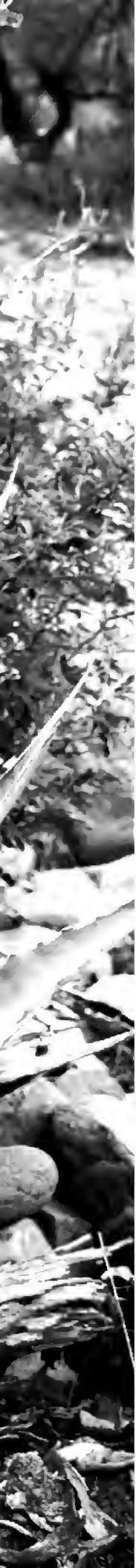
Agave has been important to humans for millennia. Agaves are also critical to the lives of many animals that make their home alongside humans in the desert. Migratory bats, hummingbirds and hawk-moths (that sometime seem as big as hummingbirds) all visit agave flowers for nectar and pollen. Without agave in the landscape many of these animal species would suffer. Conversely, without the animals, many agave species would suffer. Agaves, animals and humans are all interdependent.

Because agave is life.



LONG-LOST AGAVE

**LONG-LOST CROP FOUND GROWING
IN ANCIENT ARIZONA FIELDS**



Scientists at Desert Botanical Garden and Archaeology Southwest recently published their discovery of a domesticated species of agave growing in ancient farm fields in southern Arizona's San Pedro River Valley. In the journal *Systematic Botany*, Wendy Hodgson and Andrew Salywon (Desert Botanical Garden) and William Doolittle (Archaeology Southwest) describe the once-prolific crop, which they have named *Agave sanpedroensis*, as well as the archaeological evidence of its cultivation by ancient farmers of the Sonoran Desert, whom archaeologists associate with the Hohokam archaeological culture.

"The discovery of *Agave sanpedroensis* is significant because it provides living proof, backed by archaeological evidence, that the Hohokam were growing agaves on a large scale," says lead author and senior research botanist Wendy Hodgson. "Although it is not surprising that farmers were growing them near their settlements, the *how*—the way people transformed the landscape to grow these plants by placing favorable rock formations and linear terraces in highly arid regions—

documented by the Hohokam—has previously been largely undocumented. Ancient Linear Terraces, some of which are over 50 miles wide, border the San Pedro River flood plain, in addition to numerous smaller terraces. Archaeologists found pitular stone knives used to harvest and process agave for food, fiber, medicine and other uses. The palms would have served as useful indicators of soil conditions for the vegetative offsets farmers placed in them. These offsets were laid out in rows that grew in a quick response to underground stem.

"We have 15 agave plants growing in a field of hundreds and about 200 surviving plants that we have been able to dig up," says lead author Wendy Hodgson. "The agave plants in the field are mostly by vegetative offsets and not by seeds, so we don't know if a single plant that looks similar. This leads us to hypothesize that it was a domesticated crop." Domesticated plants result from human selection for certain traits and are reliant on humans for their cultivation.

Co-author and research botanist Andrew Salywon adds, "Because it doesn't produce seed, this agave lacks the ability to spread or populations that perish through drought and being eaten by animals. These surviving plants are clones growing in the very same fields where farmers planted them more than 600 years ago. This is an opportunity to bring this crop back from the brink of extinction and learn more about the Hohokam economy."

Archaeologist Bill Doolittle agrees that the human side of the plant's story is significant. "Archaeologists have long written about the so-called collapse of Hohokam population in the 1300s and 1400s," he says. "This resilient agave species embodies an important counter-narrative: The ancestors of today's O'odham people found ways to survive under dramatically changed conditions. Unlike genetically domesticated crops, however, the culturally resilient O'odham have adapted and are thriving."



STRATEGIC PLAN

2019 - 2023

EMILY KNAPP

The theme for the 2019-2023 Strategic Plan emerged at a board retreat in 2016, as the Garden began to contemplate the question: *“What will it take for the Garden to be a leader among other public gardens?”* As the board co-chairs of the Strategic Planning Steering Committee and key members of staff continued the visioning process, *“Sustainability”* emerged as the unifying theme.

This new plan comes on the heels of 20 years of dramatic growth at the Garden. Starting in the late 1990s, board members and staff completed three ambitious capital campaigns that have transformed the Garden. Given the investment of more than \$50 million in the Garden over the past 20 years, the 2019-2023 Strategic Plan is a time to celebrate and build upon gains that have been made and to assure that the Garden will continue to be a powerful force for conserving and sustaining desert plants, habitats and other valuable community resources.

The Strategic Planning Steering Committee, consisting of selected Garden Trustees and senior staff members, began convening in March 2017, and over the course of nine months, the committee: endorsed the theme for the plan, updated mission, vision and values, created guiding principles for the plan, prioritized ideas and established four task forces to further develop the ideas.

Simultaneously, *“big ideas”* for advancing the Garden’s mission in the next five years were collected from Garden staff, board and volunteers. As this list was being compiled, no idea was off limits, and all were evaluated by the Strategic Planning Steering Committee. The recommendations within the plan were extensively vetted and enthusiastically supported by all Garden stakeholders.

A key piece of work completed by the Steering Committee was the development of *“Guiding Principles of Sustainability.”* There are many definitions for “sustainability”, and articulating what these principles meant to the Garden over the next five years was an important step of the planning process.

SUSTAINABILITY

The Garden is committed to striking a balance between structured planning and operational flexibility in an ever-changing world. The Garden models responsiveness and resilience while demonstrating that it can both endure and thrive in pursuit of its mission. This requires emphasizing *“the triple-bottom line,”* by excelling in three pillars of sustainability: economic, environmental and social.

ECONOMIC SUSTAINABILITY

The Garden will continue to manage responsibly its financial, human and other resources in order to support its mission for future generations. It will utilize and expand current revenue streams while identifying untapped revenue sources to diversify and support future growth.

ENVIRONMENTAL SUSTAINABILITY

The Garden will use its reputation as an expert in research, conservation, collections and horticulture of cactus and agave to become the global leader in the conservation of desert plants. The Garden is committed to sharing its knowledge and best practices to conserve and protect desert plants and habitats.

SOCIAL SUSTAINABILITY

Desert Botanical Garden ensures diversity and inclusion by providing an environment, in which everyone feels welcome, engaged and valued. We strive to support broader community efforts to encourage conversations surrounding critical issues. As a founding institution in our community, we will lead by example to develop and implement strategies to ensure that our board, staff and volunteers reflect the diversity of the audiences that we serve.





The Steering committee created four task forces to make final recommendations of the strategic initiatives to include in the plan. These task forces were comprised of Garden trustees, staff, volunteers and community stakeholders. They met monthly from December 2017 through April 2018 and completed formal recommendation reports presented to the Board of Trustees at their annual retreat in May 2018.

The Economic Sustainability Task Force approached planning for the next five years by thinking through two distinct questions. The first question explored how the Garden will continue to run at high capacity. The second question explored priorities for assessing opportunities for enhancement beyond current revenue streams.

The Environmental Sustainability Task Force recognized that conserving desert plants has been at the core of the Garden's mission since its founding in 1939. Acting at local through global scales, the Garden currently makes demonstrable contributions to preventing the loss of plant biodiversity in the Sonoran Desert and beyond. This task force recommended that in addition to expanding the current Horticulture, Research, Conservation and Collections programs, the Garden will undertake incremental new ideas that will advance our conservation work.

The Garden understands that authentically engaging new audiences is crucial to attaining and maintaining the social (and economic) sustainability of the Garden and that building cultural capacity through diversity, equity and inclusion initiatives is a key to success. Though we currently engage some audiences through education and event programming, special exhibits, community partnerships and marketing communication efforts, no one is more acutely aware than we are that not all audiences are enjoying what the Garden has to offer. The Social Sustainability Task Force worked to identify target audiences that the Garden will strategically engage with over the next five years and looks forward to creating and evaluating new community focused programs and partnerships and continuing our current offering.

The fourth task force focused on branding and communication. Harold Dorenbecher, Garden trustee and chair of this task force explains, ***“tying the pillars together and giving voice to the strategic plan will be the efforts to appropriately position the Garden’s message and brand in all of our goals. To achieve greater success our communication plans will illustrate, educate and demonstrate the resources of the Garden, which support our conservation work, environmental research, our desire to reach new audiences and provide for the financial strength of the Garden.”***

The creation of this plan has involved the brain power and dedication of hundreds of people who together have generously devoted countless hours to creating this document, and we thank each and every person who has been a part of this process. The Garden is excited to begin work on this strategic plan in conjunction with the celebration of its 80th anniversary. By the time the Garden turns 85 in 2024, we expect to have accomplished every goal set forth in the plan, as we continue to chart a course for the Garden and our community to flourish in the future.

“I applaud the Garden for embarking on a strategic planning process with stellar board, staff and volunteer leadership; and constructive, meaningful conversations. This new plan’s focus on sustainability is important.”

Shelley Cohn, Board President

CACTUS KIDS



CELINA COLEMAN

For those who may not have grown up in the Sonoran Desert, the idea of playing outside might seem intimidating. Our spring and summer temperatures can be overwhelming, and many of our most well-known plants could harm little hands wanting to touch or climb them. However, there are thousands of ways to play safely and creatively outdoors in Arizona, with children of all ages. The Garden provides multiple opportunities for nature play during our classes and workshops, and we encourage you to try some of our favorite ideas at home or a nearby park.

LOOSE PARTS



SUPPLIES

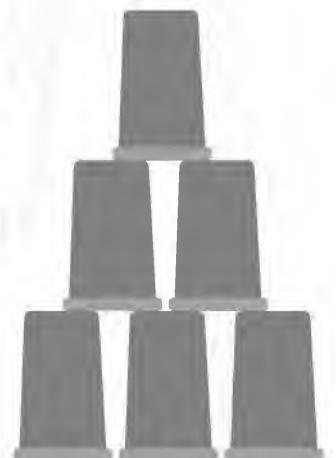
- OBJECTS FROM YOUR YARD: STICKS, SEEDS, FLOWERS, LEAVES, ROCKS
- RECYCLED/REUSED MATERIALS: POPSICLE STICKS, CUPS, WATER BOTTLES
- BAMBOO
- PVC PIPES
- CUT AND SANDED WOOD PIECES

INSTRUCTIONS

- HAVE YOUR CHILD HELP YOU GATHER MATERIALS.
- CHECK THOROUGHLY FOR SPLINTERS, SHARP EDGES OR UNFRIENDLY CRITTERS.
- MOVE, SORT, STACK, PLAY!

TIPS

- ENCOURAGE YOUNGER CHILDREN TO DESCRIBE WHAT THEY SEE, FEEL AND HEAR.
- ENCOURAGE OLDER CHILDREN TO TRY DESIGNING AND BUILDING SOMETHING.



WATER & MUD

SUPPLIES

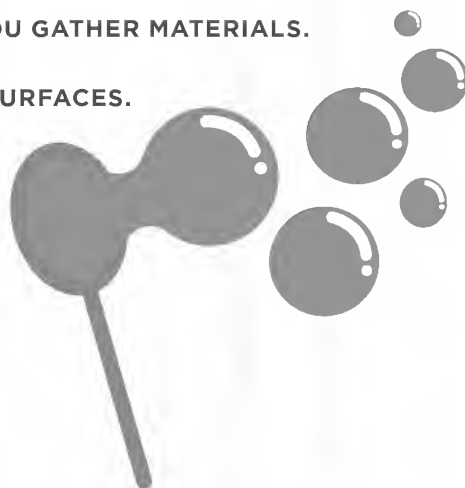
- HOSE
- BUCKETS
- SQUIRT BOTTLES
- SPONGES
- PAINT BRUSHES
- BUBBLES

INSTRUCTIONS

- HAVE YOUR CHILD HELP YOU GATHER MATERIALS.
- ADD WATER.
- LOOK OUT FOR SLIPPERY SURFACES.
- SPLASH, SQUIRT, PLAY!

TIPS

CONCRETE OR DRY CLAY SURFACES ARE EXCELLENT “EASELS” FOR PAINTING WITH WATER AND MUD.



NATURE SOUND MAKERS

SUPPLIES

- OBJECTS FROM YOUR OWN YARD: STICKS, SEEDS, ROCKS
- BUCKETS
- RECYCLED MATERIALS: WATER BOTTLES, MILK JUGS, PLASTIC CONTAINERS, CANS
- SPONGES

INSTRUCTIONS

- HAVE YOUR CHILD HELP YOU GATHER MATERIALS.
- SET UP YOUR INSTRUMENTS.
- SHAKE, TAP, DRUM, PLAY!

TIPS

PARTIALLY FILL A WATER BOTTLE WITH SEEDS, DRIED BEANS OR ROCKS, AND SECURE WITH A LID TO MAKE A MUSICAL SHAKER.



CONSIDER THIS

Children who connect with nature at an early age are more likely to grow into environmentally conscious adults. Start small and start local by encouraging children to see the Sonoran Desert as a home that they share that home with unique plants and animals.

garden grown.

- LIFELONG LEARNING -

1
year



BABY BOOJUM
First handful of soil

10
years



SCHOOL FIELD TRIP
Harvest saguaro fruit

20
years



FLASHLIGHT TOURS
A romantic night gazing at the stars

30
years



DESERT LANDSCAPE SCHOOL
Develop home landscaping skills

40^{years}



COOKING CLASS

Start a holiday tradition, learn to make tamales

60^{years}



VOLUNTEER

Share your love of the desert

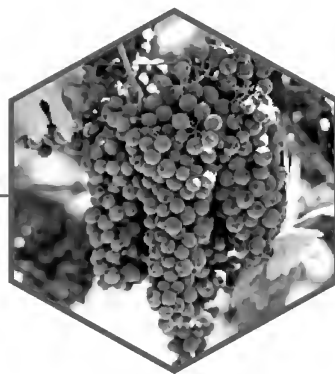
80^{years}



SUNRISE TAI CHI

Stimulate the mind, promote good health

50^{years}



WILLCOX TRIP

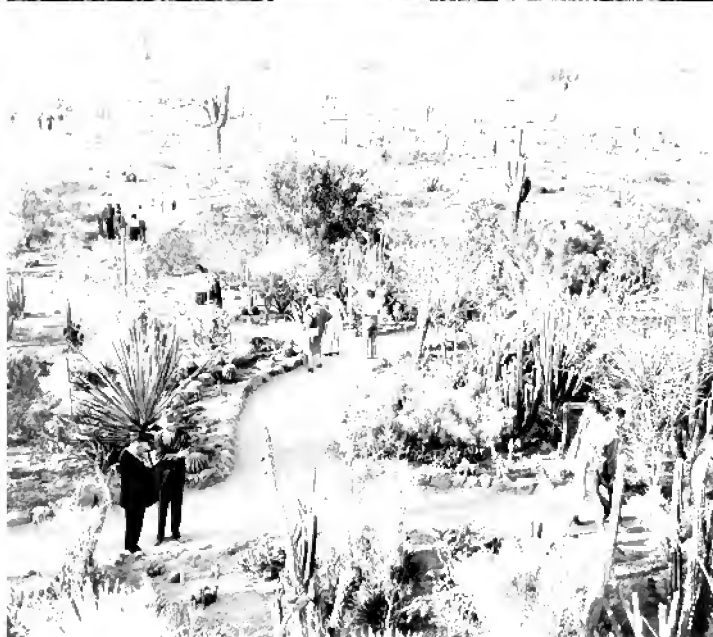
Explore Arizona vineyards

70^{years}



GARDENING CLASS

Learn to downsize by gardening in pots





I can't recall

I can't recall
how the sunlight feels on my skin.

The darkness, I'm well aware the
airless way it smothers me.

If I could see myself-bruised, beaten,
withered and worn-it stings.

I don't think I'd like what I'd see.

Wrinkles and scars feel 10 miles deep.

I can't recall
how the sunlight feels on my skin.

One, two, three, four, five, six walls—
I can't breathe.

Ripped from my home-I would have been
incredible. I'm stronger than you think.

Ripped from my home-I would have been beautiful. Down, down, down, I'm sinking.

I can't feel my legs; my clock is ticking.

I can't recall
how the sunlight feels on my skin.

Louder now. Roaring engines,
voices yelling.

Is this space getting smaller,
or am I swelling?

Ground is shaking, body aching,
breaks are screaming,
walls are shifting, leaning.

Is this it, or am I dreaming?

I can't recall
how the sunlight feels on my skin.

Quiet now. It's getting bright.

Am I alive? Am I alright?

One deep breath and ten seconds of light.

I'm right back now to where I'd been.

And here I am forgetting again,
how the sunlight feels on my skin.

Cactus appear to be abundant when one lives in the desert, but the reality is that more than a third of all cactus species in the world are threatened with extinction. The main threat to them—poaching. Every year, thousands of cactus are illegally dug from the ground and hauled away from their native environment. Entire populations of species have been wiped out overnight. Stuffed into boxes and crammed into suitcases for long car, plane or train journeys—some survive, but many do not. Why does this happen? There is a massive market for cactus. Individuals or groups can make a great deal of money selling cactus collected from the wild. And, the rarer they are, the more valuable they are.

Smuggled cactus are often discovered at ports of entry and exit to the United States. Desert Botanical Garden is contacted and asked to take these cactus in and rehabilitate them. We do this through an agreement with the U.S. Fish and Wildlife Service that designates the Garden as a Plant Rescue Center. While we work diligently to understand, protect and conserve our treasured desert environment, the threat of poaching is real. Cactus need your help. By supporting the Garden, you're supporting our efforts to end illegal cactus smuggling and cactus extinction.

Afterword by Dr. Kimberlie McCue, Director of Research, Conservation & Collections

Cactus on TREND

NORA BURBA TRULSSON

The prickly pear pattern is on everything, from household items to high fashion. Unless your forays into the retail sphere have been limited to buying tools or appliances the last two years, you've probably noticed cactus imagery on everything from crib sheets and iPhone® cases to wallpaper and red carpet-worthy evening gowns. Stylized, graphic versions of prickly pears, barrel cactus and saguaros are appearing on everything these days, surpassing peace symbols, smiley faces, daisies and emojis of yore. Cactus, it seems, is on point.

Of course, in Arizona—and particularly at Desert Botanical Garden and the Garden Shop—cactus is a way of life, not a style. But right now, both the Garden and the shop are on trend.

The current craziness for cactus might have its murky roots in high fashion. Back in 2015, Chicago designer and artist Mady Terry created an over-scale knit saguaro sweater and hooded-tooled leather duffel bag inspired after her road trip to Arizona. Her sister vacationed in a rural desert and loved the plants. Her sister married a local, and she and her sister-in-law visited the desert often. Terry's sister-in-law was a local, and she and her sister-in-law visited the desert often.





Sophie & Harwood Seiger



Reg Manning



Maynard Dixon



Maynard Dixon

The use of stylized cactus imagery, however, goes way back in Arizona, particularly when it came to touting travel and tourism. Modernist painter and illustrator Maynard Dixon, who had a home in Tucson, promoted Arizona's desert landscape in the early 1900s through stylized, graphic images of saguaros for both the covers of *Sunset* magazine and his fine art works.

Cactus-themed postcards also helped drive Arizona tourism. Rather than going with botanically correct illustrations, Arizona artists like Hal Empie—through his Empie Cartoon Kards—and cartoonist Reg Manning, aka “the Cactus Cartoonist,” started creating humorous postcards in the 1930s that were illustrated with gangly cowboys and anthropomorphic cactus. After World War II, Bob Petley (he of Jackalope fame) foresaw even more Arizona tourism and established Petley Studios in Phoenix to produce both cartoon and photographic postcards of the desert, many depicting cactus, front and center. The postcards found their way around the world, promoting Arizona as cactus central.

In 1941, Tucson civic booster Roy Drachman and photographer Charles Herbert pulled one of the greatest Arizona-tourism publicity stunts of all time by dressing a woman in a decidedly uncomfortable two-piece sunsuit, made of saguaro cactus tops and prickly pear pads. The photo ran in *Life* magazine and in publications around the world and still lives on as a vintage postcard and note card. In later years, cactus worked its way into fashion and interior design. From the 1950s through the '70s, artists Sophie and Harwood Steiger's Tubac studio became known for producing stylized, often cactus-themed textiles that were used as tablecloths, tea towels, dresses, runners and pillows. The items and pieces of fabric are now coveted by collectors for their midcentury appeal.



Mady Berry



Dolce & Gabbana



While cactus imagery has cycled in and out over the decades, this current trend has not gone unnoticed by local creatives. Scottsdale's Leenie and David Engel founded American Studio some 30 years ago, designing lunch bags, backpacks, binders, pencil cases and more for stylish school kids, sold through retailers like Walmart and Costco. With Leenie, an artist, handling the design and David overseeing the marketing end of the business, the couple has explored many youthful design themes over the years, including peace symbols, hearts, Scottie dogs and all things glittery. This year, they've developed a cactus pattern—a friendly image of a saguaro with upraised arms, set against a purple background. “We didn’t want it to be too realistic,” explains Leenie. “It has to be fun, understandable to young children and recognizable in seven seconds or less when it’s seen in a store.”

Gilbert-based interior designer Jo Gick has also been incorporating cactus in her projects, using live succulents as accents in her home-design projects. “They’re architectural and work well in modern settings,” she points out. Gick—a master crafter who starred in “Making It,” the recent NBC craft-centric reality show—also makes a line of handcrafted decorative items called Oh So Jo, geared toward kids. The products include a sunglasses-wearing cactus wall hanging and colorful acrylic cactus that can be “planted” in rock-filled pots. Gick, though, cautions about overdoing it with the cactus theme at home. “The cactus trend has been hot for about 18 months now,” she says, “but you don’t want to take it too far. Even if you’re doing a child’s room, you don’t want everything to be cactus. Just sprinkle it in for best effect.”

Naturally, the Garden Shop is sprinkled with many things cactus, especially after a recent expansion that doubled the shop's size. "We've changed direction in the last few years to capture millennial shoppers," explains shop director Alex Herrera. "Our cactus offerings now have a sense of humor or a vintage look." One table in the shop is loaded with those examples, including cactus tees emblazoned with "Not a Hugger," a vintage-looking ceramic saguaro ring holder, plus pins, patches and more. Another expanded cactus category in the shop is wellness products, where visitors can find prickly pear soaps, agave chapstick or barrel cactus lotion.

"I would say that almost 60 percent of our merchandise is somehow cactus-related," Herrera says. "Given that we're in the heart of Sonoran desert, it's not surprising that we have a lot of cactus-themed items. But we also have a lot of other things, like vintage-style clothing, home decor, and more. We want to make sure we have something for everyone." Herrera says the shop's expansion was a response to the growing popularity of cactus-themed merchandise, which he says has been a trend for several years.



The Garden Shop at Desert Botanical Garden



GARDEN HORTI- CULTURE:

80 YEARS OF GROWTH

TRACY RHODES

Dawn gilds the Papago buttes. At their feet stands a man near a collection of bare-rooted cactus, pondering the ground. A worn mattock hangs in his grip, poised to pulverize hardpan. Together, they're transforming this hillside into a green oasis, life-rich, a triumph of conservation over consumption. His arms bend; the pick swings upward ... A sudden buzz startles him, halting his arc. Cicadas? His back pocket vibrates. Oh, incoming text. It'll have to wait. He strikes; dirt flies. The Garden grows.

In the eight decades since Desert Botanical Garden's founders first struck tools to earth, the physical job of a staff horticulturist has changed surprisingly little. On the surface, our labors often appear (and feel) as rustic as those of our founding gardeners.

Our work style is, admittedly, rather old-fashioned. We work with mainly hand tools, water and patience, since blowers and trimmers could damage our plants, and their decibels disrupt a peaceful visitor experience. Tools have improved, thanks to engineering and materials like fiberglass, polyethylene, and metal alloys. Heavy equipment helps us accomplish large installations in short timespans. Still, human muscle remains the primary force that sculpts a garden out of wilderness, same as it ever was.

As little as our techniques seem to have changed, however, in 80 years the environment around us has transformed. The Arizona Cactus and Native Flora Society founded the Garden out of concern for the impact that humans could have on desert ecology. Native succulents had already become gardening novelties by 1939, commodities to be harvested and shipped far away, if not destroyed by development first. In director George Lindsay's 1939-1940 annual report, detailing their team's substantial first-year progress in plant collection and display, he emphasized the value of not only displaying plant collections, but of conserving and studying them.

Even the founders' foresight, however, could scarcely have predicted the scale of urbanization that has engulfed Papago Park, creating not only a heat-island effect but pollution and human habitation pressures. Coupled with climate change, urban development creates stress on our unique desert lifeforms. By 1940, Phoenix's population was 65,414; in 2017, it was 1.6 million. With the Southwest's population and

average temperatures both rising, today the term 'oasis' has never meant more to the Garden's existence, nor has its mission.

Today, plants comprise 57 percent of endangered species in the U.S., yet receive less than 4 percent of funding for endangered species. Native plant populations are declining throughout the U.S. Forests, grasslands, victory gardens and flowerbeds have given way to monocultured lawns and gravelscapes. Animal migration and breeding are disrupted by loss of local habitat. Nationally franchised garden stores often stock ornamental plants unsuitable for our extreme desert climate.

Studies show that society's 'plant blindness' is increasing. From small farming to hothouses, poetry to artwork, plants were simply more of a cultural mainstay in 1939 than they are today. Children are engaged by entertainment and education, using far more imagery of animals than plants. Universities are cutting botany and horticulture programs for lack of enrollment. Faced with extreme climates and a universe of electronic distractions, many Valley residents spend little time outdoors, to the point where deficiency in Vitamin D—the 'sun vitamin'—has become commonplace.

Renewing society's fascination with plants is a worthy cause, considering that plants are the source of, well, almost everything we need to survive. Plants don't only nourish us; they provide medicine, cloth, construction materials, rubber, furniture, print media, sun protection ... The list goes on. They help create breathable atmosphere and move carbon from air into soil to feed new botanical generations. Plants make or break a region's ability to support wildlife.

We humans need sun, and we need plants. Frankly, neither needs us back.

Plants may face consequences, however, when humans alter nature. Our future depends on caring about and supporting healthy ecosystems. The practice of horticulture begins here. A marriage of science and society, horticulture is the skilled cultivation of plants and their environment for public benefit.

At the Garden, we strive for balance between progress and pragmatism. Both our native and non-native plant collections are chosen for their inherent tolerance of desert conditions. We avoid using most of the synthetic garden chemicals invented in post-WWII's industrial boom. Believing that nature is usually best at correcting itself, we endorse Integrated Pest Management, a philosophy of garden problem-solving born in the 1950s and 60s, as entomologists and botanists grew concerned with the environmental impact of industrialized pest-control methodologies. When it comes to modern horticultural science, it seems like everything old is new again.

Today's horticulturists study not only desert plants' characteristics and behavior but also their internal biology. We're aware of the cycles of CAM photosynthesis and seasonal dormancy, which ensure survival in extreme heat and dry, alkaline soil. We know which flowering plants feed what butterfly caterpillar species and why others will attract a hummingbird or bee instead. We memorize botanical family names, their origins and common traits. Often we know a plant's ethnobotany—i.e., the edible, medicinal or domestic products derived from it. Growing trials help us provide better plants and cultivation tips to desert gardeners.

Our work doesn't just happen in the dirt, however. More than ever, our horticultural influence extends beyond the Garden. Field trips enable us to expand our collections and observe

plants in natural habitat. Collaborating with other botanical gardens, organizations, nurseries and conservation groups provides force multipliers of knowledge and effort. Our Plant Sales connect thousands to appropriate desert plants and expert advice. By serving as adult educators and media contributors, we distribute accurate information to both gardeners and landscaping professionals. The internet offers us the potential of a global audience.

The Valley of the Sun lies where three huge rivers meet, in a watershed larger than New York State blessed with two rainy seasons. It's a magnet for life. The Hohokam, Pima and Maricopa nations were drawn to this place. Western settlers realized its potential, and Garden horticulturists understand its ongoing truth. We're proud that our work benefits the land we call home. We know that some of the specimens we plant today could still be around educating people in 80 years, just like the *Kitchell Family* Heritage Garden's huge cardons, which were planted at the dawn of our Garden's journey.

Horticulture's challenge is to harness knowledge and beauty as our plants harness the elements. Ensuring our plants' happiness requires us to employ skills, ranging from brute force to the delicate touch of surgeons—not to mention being OK with being coated in dirt, sweat and sometimes a little blood. In the end, though, hard labor and dishevelment are small prices to pay for a deeply gratifying career. Mr. Lindsay might well have said the same, all the way back in 1939.

A Living Memorial will Ignite and Inspire Lifelong Learning

The Future of the Myrna H. Berger Children and Family Garden

Amber Ramirez, J.D.

The vision for the future *Myrna H. Berger* Children and Family Garden is to ignite and inspire lifelong learning about nature and the desert environment for children and families.

This 3-acre “garden within a garden” will serve as a living memorial to the woman whose name will grace the property thanks to her husband’s legacy gift. Born Nov. 16, 1938, Myrna first became a Garden member with her husband in 1997 after moving from Rochester, N.Y., to spend winter months in Scottsdale. Despite a childhood bout of polio that affected her throughout her life, she maintained a deep appreciation of life and enjoyed the beauty it offered. Perhaps prompted by her childhood illness, she lived life with a gentle spirit and fine character.

As described by her husband, Myrna instantly found inner peace and appreciated the Garden as an accessible, comfortable place to explore during her first visit. Inspired by a sense of joy and wonder about nature, Myrna particularly enjoyed seeing children discover Garden trails, expressing to her husband that this special place was ideal for educating children about nature.

As Richard Louv, featured speaker at the 2017 unveiling of the master plan for the *Myrna H. Berger* Children and Family Garden, wrote in his book “Vitamin N” (“N” for

nature), there’s a “growing body of scientific research about the benefits of the nature experience for children.”

Noted in the master plan, “children who experience nature with a trusted adult develop lifelong earth stewardship and environment sensitivity” and “family gardens develop a more meaningful experience for the adult.” Designed to provide opportunities for imagination, self-expression, movement and collaboration, the garden will contribute to the successful development of the whole child, resulting in a healthy, engaged, environmentally literate member of our community. The garden will also provide opportunities for children and families to experience nature in ways they wouldn’t usually have access to at home or school.

Celina Coleman, children’s program director, notes “We interviewed more than 200 families in the Phoenix area in 2015 and found that children of all ages want to engage in collaborative and creative play and these findings were key criteria in developing the master plan for our Children and Family Garden.”

Didier Design Studio, who was awarded the 2018 Unbuilt Honor Award by the Arizona chapter of American Society of Landscape Architects, created the designs for this space, supported by a grant from Arizona Community Foundation. Described in the *Mesquite Journal* as “artful,



whimsical and deeply rooted in the Sonoran Desert,” visitors of all ages will gain appreciation for nature through participation and immersion. The plan uses art as a bridge between science and people, incorporating an entry gateway that will interpret a landscape shaped by wind, cactus sculptures that will demonstrate water storage and a cactus village that will display the life cycle of a saguaro.

Garden education staff share that the new garden will include a makers space that will support increased programming, including early childhood programs like Seedlings and Baby Boojums, as well as Garden Camp Adventures. Seedlings has been a staple at the Garden for more than 20 years. Little ones ages 3-5 years join their caregivers in exploring nature, and Baby Boojums engages infants and toddlers ages 6-30 months and accompanying caregivers. Garden Camp Adventures have grown rapidly in just the last three years. In 2016, we had two weeks of summer camp with 39 campers. In 2018, we had four weeks of summer camp and one week of spring camp with a total of 172 campers. In the seasons ahead we look to increasing offerings from spring and summer to also include fall and winter breaks, as well as additional capacity for each session.

As Celina notes, “visitors won’t have to wait to play in these new ways. While we await the groundbreaking, the Garden will offer playful ‘pop-ups’ to help us test some new concepts and get the word out about the exciting developments. Visitors will be able to dress as animals and build a burrow or plant rocks in a mud garden during the 80th Anniversary Community Celebration on Feb. 16. Families can also sign up for our new Family Learning Labs or Family Playtime programs, which encourage participants to engage in science experiments and nature-based projects on their own timetables and at their own pace.”

Through the foresight of Mr. and Mrs. Berger, Didier Design Studio, Arizona Community Foundation and children and family master plan committee members, the *Myrna H. Berger* Children and Family Garden will be a living memorial to Myrna that we hope will inspire lifelong learning about nature for children, their families and for future generations for years to come.

Explore current children program offerings by visiting dbg.org/learn or by contacting Celina Coleman at ccoleman@dbg.org or 480.481.2066.

2018 Children's Program Attendance by the Numbers

2016-2017 Myrna H. Berger Children and Family Garden Master Plan Committee Members







THE

AS
TOLD
BY

Kids

DANA TERRAZAS

Gather a group of kids together, and you never know what funny, truthful and clever things they will say. Seeing things from a child's perspective always makes you take a step back and reexamine the world around you. Kids are the future Garden-goers, and recently we chatted with a few kids about the Garden's 80th anniversary and how they see the Garden in the future.

I was joined by Tristan (9), Harrison (6), Evangeline (6), Clementine (3) and Connor (6). These kids all have visited the Garden many times, having attended events, camps or classes. Our chat started at the beginning of the Garden's history, and I asked them what they thought the Garden looked like in 1939 when it opened. Evangeline imagined it was small, not just the Garden but the cactus too, because they were just born. Harrison added he was sure there were a lot of cactus, and he imagined there was a lot more rain back then.

They could not even imagine the Garden has grown so much that our collection now has 50,000 plants. They believed it was anywhere from 10 (yes, 10) to maybe 500. When I talked to them about the Garden turning 80, most didn't know anything that old except a great grandparent. They couldn't imagine when the Garden opened there were 55,000 people in the Phoenix Valley. Their best guess was maybe 50 people in Phoenix, but it was certainly dry and hot.

If this group of kids were in charge of the Garden's Anniversary Celebration, they would have the following demands for the party. Every single kid wanted cake, balloons and prizes, but a few other celebratory ideas may surprise you.

Tristan chimed in, "We should invite the President. He for sure should be here." They said we need a bouncy house, hands-on experiments and, of course a cactus-shaped cake.

If the kids could help build a new Garden in the future, they all agreed a swimming pool should be added. Evangeline thought it would be great if they could camp overnight at the Garden, and Tristan added that the Garden should build a hotel in case you didn't see everything on the first day you can see it the next morning. Connor envisioned guests zip lining through the trails. They also wanted to grow their own plants and eat vegetables that they picked from the Garden.

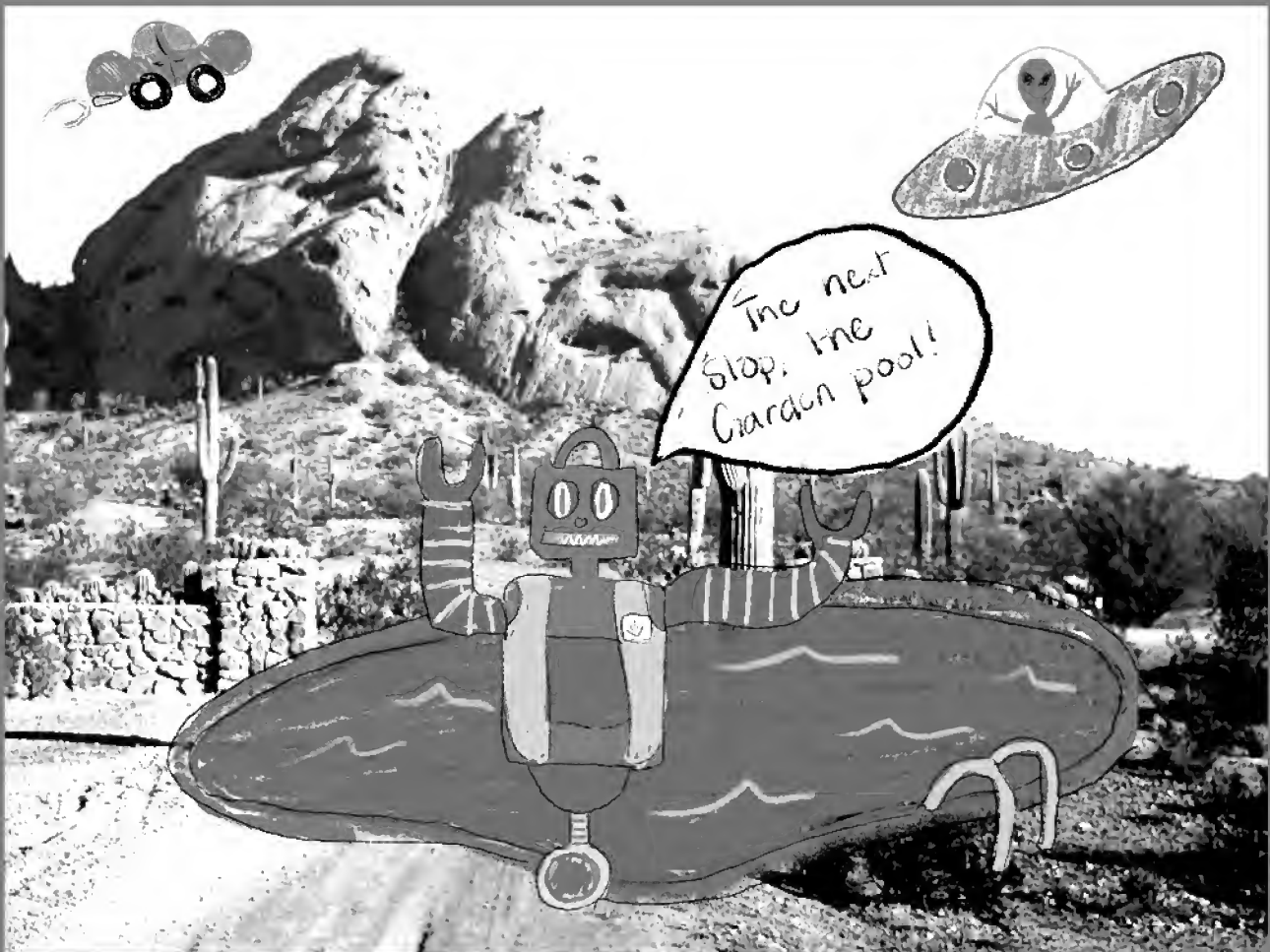
When the kids reflected on what the world and Garden would look like in the next 80 years, they all agreed robots would be sharing the space with the plants. From robot Admissions staff to robot tour guides maybe even robot plants, for sure this place would be high-tech. Harrison and the group all envision seeing flying cars in the distance. Connor said he imagined the Garden would be filled with core technology and buttons—maybe even aliens visiting the Garden.

Evangeline and Clementine assumed the Garden would have to be rebuilt, because it would be very old by then and possibly it would move inside where young visitors could meet robot bugs. Connor said plants with buttons next to them that talked to people would be cool and interactive.

When I shared with them that cactus are threatened just like pandas and coral, they couldn't believe it. They said, "How? There are so many?" All of them appeared saddened by this, but all knew they could help save cactus and began sharing ideas on how they could help. One idea was that visitors should be given cactus seeds when they visit to plant more at home, but they added that we need to water them or even start an adopt a cactus program. They agreed that being a member and donating money and time would help cactus.

After reading the above, we should be confident that the Garden will continue to have a passionate group of future Garden goers and cactus lovers to support us.

CATCH A Glimpse





THE GARDEN:

TRANSFORMING THE LANDSCAPE AND ENGAGING NEW AUDIENCES

ELAINE MCGINN

All Garden activities from research and conservation to education and outreach converge in the public forum of exhibitions.

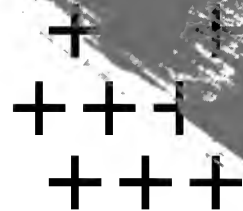
At Desert Botanical Garden, art exhibitions broaden the visitor experience by providing opportunities for visitors to engage with its mission and explore connections between art and nature. Exhibits are not merely a core function of the Garden but a powerful means of engagement with our visitors.

The goals and objectives of the Garden's art exhibition program, which began in 2002, were based on a simple philosophy of building new audiences by showcasing the Garden's collections and landscape in new and surprising ways. The outcome of this program has allowed the Garden to meet institutional goals, realize new revenue streams, enhance programming and bring increased awareness of the Garden both locally and nationally.

What started out as a small and local exhibition program changed dramatically with our first Chihuly glass exhibition, **The Nature of Glass**, which debuted in 2008. This exhibition enriched the Garden trails with striking and vibrant glass sculptures setting a magical presence amid the desert plants that transformed the Garden experience.

Here are additional highlights from the last 16 years of art in the Garden:





1

CHILDHOOD DREAMS

2007

World-renowned artist Patrick Dougherty transformed hundreds of willow branches into magnificent whirling, animated sculptures on the *Harriet K. Maxwell Desert Wildflower Trail*. The environmental sculpture installations were interactive and designed to ignite a childlike imagination in each viewer.



2

PICASSO 25 YEARS OF EDITION CERAMICS

FROM THE EDWARD WESTON COLLECTION

2007

Prolific and iconic artist Pablo Picasso had his blue and cubist periods, but in the latter part of his life, he took up clay as a medium. Working with master ceramic artisans at the Madoura workshop in the south of France, Picasso created thousands of plates, pitchers, bowls and vases of which 65 were on view.

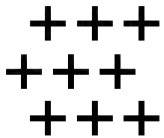
3

DESIGN FOR A LIVING WORLD

2012

This collaboration with The Nature Conservancy transformed *Dorrance Hall* into a large-scale exhibition that brought together international product design and the natural environment and ignited powerful questions about our choices of materials and production practices. Each design was inspired by nature and sustainable choices, and explored untraditional substances, including chicle latex, salmon leather and vegetable ivory, seeking to illuminate the complexity and vitality of materials at their source.





DALE CHIHULY IN THE GARDEN

4

2013

Artist Dale Chihuly returned to the Garden with a stunning exhibition of his extraordinary and vibrant works of art. Chihuly is credited with revolutionizing the Studio Glass movement and elevating the perception of the glass medium from craft to fine art. Each site-specific installation enhanced the natural beauty of the Garden and excited hundreds of thousands of visitors from around the world.

5 ARIZONA INDIGENOUS: NEW TURNED WOOD BY PHILIP & MATT MOULTHROP

2015

The Garden presented new works by world-renowned artists Philip and Matt Moulthrop. Woodturning has been a Moulthrop family legacy for three generations and their pieces are immediately recognizable by their distinct contemporary forms. This exhibition featured a collection of turned wood that revealed the inherent beauty of trees and shrubs native to Arizona with wood collected by Desert Botanical Garden sources.



SONORAN LIGHT BY BRUCE MUNRO

6

2015-2016

Sonoran Light at Desert Botanical Garden showcased eight large-scale, light-based installations using an inventive array of materials and hundreds of miles of glowing fiber optics. Located throughout the Garden, British artist Bruce Munro's exhibition reflected his unique interpretation of the Sonoran Desert.



7 **MARGARITA CABRERA,** ***THE SPACE IN BETWEEN*** **2016**

The *Space in Between* was a collaboration between artist Margarita Cabrera, the Arizona State University Art Museum and the Garden. Cabrera led workshops with communities from the Arizona region to create soft sculptures of desert plants made from recycled Border Patrol uniforms and embroidered with personal stories of immigration. The artworks were intended to promote a cultural dialogue around themes in relationship to community, craft, immigration, cultural identity, labor practices and sustainability.



8 **JUN KANEKO AT DESERT BOTANICAL GARDEN** **2017-2018**

Bold, monumental sculptures of Japanese-American artist Jun Kaneko were located throughout the Garden trails. Kaneko's colorfully glazed ceramic and bronze forms were beautifully set in the rich backdrop of the Garden's desert flora. Kaneko's imaginative color palettes, whimsical Tanukis and iconic Dango forms made for an enjoyable experience for guests of all ages.



DESERT BOTANICAL *garden*

To view the Garden's
**honor roll of generous
donors** who make this and
all anniversary celebrations
possible, please visit
dbg.org/support/honor-roll80



80 YEARS OF THE GARDEN

To celebrate its 80th anniversary, the Garden will offer \$8 admission and host a celebration for the community. Festivities will include cake for all, hands-on family activities, 80th anniversary video screening, geocaching and much more.

FEB. 16, 2019 | 8 a.m - 2 p.m.

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HOME AND GARDEN



OPEN SPACES

KERIDWEN CORNELIUS



The natural glory of Phoenix has a history of being saved by people ahead of their times. Depression-era environmentalists fought for land and funding to create Desert Botanical Garden ... and initially failed. Post-war park officials created urban preserves in what was once the boondocks and were mocked in editorials. Horse-lovers led city councilmembers on rides through Phoenix Mountains, as bulldozers obliterated the trails behind them.

CAZCA and ROSS partners are grateful to the Nina Mason Pulliam Charitable Trust for their investment in this initiative.

Thanks to these visionaries, Maricopa County is now home to the largest set of protected areas in a predominately urban county with more than four million residents. City dwellers can saunter through nearly 200,000 acres of saguaro-striped mountains, where mule deer sip from rivers, hummingbirds zip among wildflowers and coyote pups howl at sunset. But Maricopa County is also the fastest growing county in the nation, adding 222 residents every day. And that is threatening our city's greatest asset: open spaces.

In 1939, the founders of Desert Botanical Garden could only fathom what their town would look like in 80 years. We're no different from them. If we are to be visionaries, we must imagine what the Valley will look like in 80 years. Will growth gnaw away the world's most biodiverse desert? Or will we continue to cherish our Sonoran Desert parks and preserves?

Those questions are why the Garden convened the Central Arizona Conservation Alliance (CAZCA) in 2012. This unprecedented coalition of nearly 70 organizations aims to conserve, expand and inspire love for parks, preserves and protected spaces in Central Arizona. Now CAZCA is unveiling its Regional Open Space Strategy (ROSS), a road map toward a future in which preserves and human communities help each other thrive. Along the way, the project will foster numerous exciting efforts, including smart development, citizen science, wildlife corridor protection and creation, invasive species removal and recreational opportunities.

"I would hope that 80 years from now, the people living in the Phoenix Metro area will be saying, 'Wow, those people back then, thank goodness they had the foresight to put this in place, because now we still have these fabulous open spaces,'" says Dr. Kimberlie McCue, the Garden's director of research, conservation and collections. "We have the [preserves today] because of the people that came before us ... Now it's our turn to carry it forward."





THE SEEDS OF THE STRATEGY

The first kernel of CAZCA was a question: “How do we go beyond our own Garden walls?” McCue says. “How do we take our expertise and our desire to have positive impact in our community out beyond what we do here at the Garden?” It was 2010, and the Garden was defining a strategic plan for the future. The staff hatched the idea of bringing together diverse stakeholders to preserve and grow biodiverse open spaces.

Meanwhile, the Center for the Future of Arizona—a think and “do” tank founded by former Arizona State University president Dr. Lattie Coor—had commissioned a Gallup poll, asking Arizonans what they wanted for our state. The results echoed what survey after survey has found: Arizonans say parks, preserves and trails are the state’s “greatest asset” and the quality they love most about their home. On the other hand, a majority of responders said they don’t feel a connection with their social communities. In other words, we live in a place where people cherish the mountains and saguaros but can’t ask their neighbors for a cup of sugar.

In 2011, the Center launched the Five Communities Project to explore five big ideas for creating “The Arizona

We Want.” The Garden realized their idea for an environmental alliance could simultaneously address the saguaro and sugar issues: The coalition could build community bonds by bringing people together to restore desert preserves. The Garden’s “big idea” proposal was ultimately chosen as one of the Five Communities projects. Soon after, the Nina Mason Pulliam Charitable Trust awarded the Garden a \$300,000 grant to launch the project. CAZCA was born—and quickly grew.

“I honestly don’t think that when we originally started, we realized there could be 70 different organizations [involved],” says R.J. Cardin, director of maricopa county parks and recreation, one of CAZCA’s original partner organizations. “One of the benefits of CAZCA is that I think it’s strengthened the voice for conservation of natural resources.”



“By coming together and working in a coordinated fashion,” McCue adds, “we elevate and expand the impact almost exponentially, because ... everybody’s headed toward the same goal.”

That goal is outlined in the new ROSS, the outcome of nearly two years of work that came to fruition through the leadership of four primary CAZCA partners, Maricopa County Parks and Recreation Desert Botanical Garden, McDowell Sonoran Conservancy and Sonoran Institute. The ROSS has four main aims: to “Protect and Connect” a network of natural areas, to “Sustain and Restore” biodiversity and recreation, to engender “Love and Support” for open spaces, and to “Coordinate and Elevate” planning and conservation successes. Some parts of the plan are still ideas. Others, as we’ll see, are already unfurling.

SMART DEVELOPMENT

Every time the population doubles, triple the land is converted to urban use. With that in mind, one of CAZCA’s first feats was drafting a Greenprint, a map of Central Arizona’s green infrastructure. It’s a twist on the process developers use when deciding where to locate a new subdivision or building complex. Developers look at the built environment—roads, power plants, shopping centers, etc. CAZCA’s Greenprint spotlights natural treasures like riparian areas, wildlife corridors and preserves. As a result, the gaps between those areas stand out like pressure points on an acupuncture diagram. Knowing where these potential points of connectivity are located helps conservationists, urban planners and developers strategize where to creatively incorporate nature into design and which landmarks to avoid.

Since Arizonans value open spaces, there’s an incentive for developers to maintain wildlife corridors and desert washes so residents and tenants can see bobcats wander past blooming cactuses outside their windows and feel good about living and working in eco-friendly places.

The ROSS is not anti-development; it’s pro smart development. That’s “development that includes the beauty and necessity of the natural world,” explains

Ken Schutz, The *Dr. William Huizingh* Executive Director at Desert Botanical Garden. In this vision, he says, “Phoenix in the future would be a place where development means the reverse of what development meant for the last hundred years—where we grow by reclaiming nature and incorporating and privileging nature in our daily lives.”

Achieving this goal will require “overcoming what I think are inaccurate public perceptions that you have to choose between the economy or the environment,” says John Shepard, senior director of programs at the Sonoran Institute. “In fact, if you take a look at growth throughout the Intermountain West, most of it is amenity-driven growth. People are moving to places and building businesses in places where the community sets a priority on open space.” Far from being a financial drain, open spaces flood the economy with funds. In the Grand Canyon State, outdoor recreation generates \$21.2 billion annually in direct consumer spending and \$1.4 billion in local tax revenue. The outdoor recreation industry is responsible for 201,000 jobs. Properties located next to open spaces see their values spike by 20 percent, according to a study from the National Association of Realtors.

Open spaces are also integral to the health and well-being of the community. Research shows correlations between spending time in nature and improved mental health, enhanced happiness and amplified immune function. Getting outdoors is also linked with reduced stress, lower rates of certain cancers, and decreased mortality from stroke and circulatory issues.

CAZCA is already fostering productive dialogue about smart development. At a recent meeting, two attendees presumably on opposite sides of the spectrum—a developer and a representative from the Center for Biological Diversity—sat at the same table. Yet they all had “a really positive, collaborative, cooperative conversation,” McCue says. “Everybody was willing and open to talking about alternative solutions to get to what we all want.”





Likewise, CAZCA is bringing together scientists and land managers who rarely talked to each other before. And they're realizing they can help each other by designing studies to solve ecological conundrums and implementing practical applications of research.

RESTORING OUR LEGACY, CREATING CONNECTIVITY

Maricopa County preserves are so popular that visitorship surpasses that of major national parks. That's simultaneously encouraging and worrying. Many visitors hike, bike or drive ATVs off-trail, and each individual thinks they have no impact. But as others follow in their footsteps or wheels, the effect is shocking: On aerial images, it looks like someone took an eraser to the landscape and wiped out the greenery. Combine those "spider trails" with the impacts of urban intrusion, fire, historic grazing, climate change, invasive species and limited resources for land management, and the result is a serious threat to open spaces.

"It has the potential to degrade the land, to negatively impact animal populations and plant populations," McCue says. "And ultimately the very thing that we love about these spaces starts to disappear. We love them to death."

"The Sonoran Desert is extremely fragile. These parks and preserves are all within the desert, and they're fragile too," says Bob Berger, senior program officer at the Nina Mason Pulliam Charitable Trust, a partner and funder of CAZCA. "So if the ROSS isn't implemented, then you're going to have a fractured system, which is never going to be a healthy system."

Fortunately, some CAZCA organizations are already targeting certain areas for restoration and connectivity. One such region is around the McDowell Sonoran Preserve—the nation's largest municipal preserve. Maricopa County Parks and Recreation is talking with the McDowell Sonoran Conservancy about protecting biological corridors between the Preserve, McDowell Mountain Regional Park and the Tonto National Forest. Maintaining that massive wilderness is essential for

supporting mule deer and other four-legged nomads that need room to roam.

In the West Valley, the White Tank Mountains used to be so far outside the city that county officials were ridiculed "by some" for setting it aside as a regional park. Now, a half dozen cities and towns surround the range like opera lovers around an amphitheater. Conservation organizations and local jurisdictions are using CAZCA's Greenprint to plan the preservation and expansion of biological corridors on land radiating around the White Tanks, including Skyline Regional Park in Buckeye. This would ensure that cougars, desert bighorn sheep and other native creatures "have the ability to move from these sort of isolated mountain ranges, known as "sky islands", to other mountain ranges," Shepard says. "That is really critical to the long-term viability of some of these desert species."

Shepard says organizations are also planning restoration efforts on the Lower Gila River. These include protecting water flow, removing invasive species such as tamarisk, planting native trees to enhance habitat, and providing the public with more opportunities for birding, canoeing and hiking.

FIGHTING INVASIVES, FOSTERING NATIVES

In recent years, scientists and citizen scientists have discovered an infamous enemy spreading across the Valley's preserves: buffelgrass. Public land managers brought this non-native grass to Southern Arizona in the 1930s to feed foraging cattle and prevent erosion.

Easily detonated by lightning, campfires and car sparks, buffelgrass fuels wildfires that turn saguaros into blackened skeletons. But unlike Sonoran Desert species, buffelgrass is adapted to fire. It emerges from the ashes like a phoenix, proliferating so much it prevents natives from returning.

Combating invasives like buffelgrass and tamarisk is a strong example of why CAZCA's cooperative, region-wide strategy is critical, McCue says. If one preserve

worked to keep the plundering species at bay, but the bordering BLM land or county park or national forest didn't make that effort, the invaders would continue returning. "It would be like Whack A Mole," McCue says.

To that effort, the McDowell Sonoran Conservancy has embarked on a multiyear pilot project to expand invasive species removal to neighboring McDowell Mountain Regional Park. They're training volunteers to identify, survey, remove and monitor invasives. What's more, "we're using the same kind of mapping app and data sheets with the volunteers, so as we scale that up, it'll be the same system that all the parks use," says Dr. Helen Rowe, Parsons Field Institute director at the McDowell Sonoran Conservancy. "Then all the mapping information can be centralized and shared, so we can all be on the same page."

Citizen scientists can also remotely survey our natural parks and preserves using Google Earth and inventory the disturbed areas with bare ground. Then, Rowe explains, land managers can prioritize those areas to restore by distributing native seeds and other proven techniques. That's where the Garden comes to the rescue. "The Garden is sort of a Noah's Ark of the plant world," Schutz says. "And someday instead of bringing plants into the ark, the goal is actually having them leave here and go back to the wild and restore habitats that have been lost."

LOVING THE LAND

In surveys, Arizonans say they love our open spaces. But we're typically in a long-distance relationship with nature. The average American spends 98 percent of their time indoors or in transit, according to the Environmental Protection Agency. CAZCA wants people to expand that 2 percent of outdoor time so nature becomes a deeply important part of their lives. But there's a hurdle: Many people have little experience with the great outdoors and are wary of wilderness.

"Fundamentally, I don't think a lot of people even know [the preserves] exist," Berger says. So it's necessary to inform them how they can access these areas, he adds.

"[Then] it's about people enjoying open space with a certain enlightenment about it. An educated public become educated stewards."

Connecting people with volunteer opportunities is one solution. The McDowell Sonoran Conservancy has more than 600 volunteers who lead visitors on treks through the wilds, restore the landscape, tidy up trails, help conduct scientific studies and more. "Citizen science and volunteerism can be such a powerful tool for engagement," Rowe says. "Once they start getting engaged, they get passionate about all these ideas. People have a hunger for learning more about the desert and seeing what they can do."

In addition, volunteers contributed more than 100,000 hours to Maricopa County Parks and Recreation in 2017. The department has a full-time volunteer coordinator who matchmakes individuals with projects that appeal to them. CAZCA's website, MyMountainParks.org, serves as a menu of volunteer and citizen science opportunities in parks and preserves throughout the Country.

While the current corps of volunteers is robust, the ROSS's goal is to "go beyond the choir"—to inspire a new group of environmental friends and stewards. CAZCA holds conservation service days for corporate groups, including Intel and Target. "The days I've gone to those events, everybody is happy to be there. It makes people feel good," McCue says. "And when you have a volunteer who comes out ... I'm quite certain they go home, and at the dinner table, they're telling their family, and they're gonna tell their friends, and it sort of has this amplification effect."

CAZCA also plans to help teachers learn to incorporate nature play and environmental education into their curricula. The coalition already offers kid friendly conservation projects, such as creating butterfly habitat. The Garden hosts camps and classes for kids and teachers, and in the next several years, it will build a Children and Family Garden so kids can play among the plants and rocks. Meanwhile, the McDowell



Sonoran Conservancy holds children's programs, including the Junior Citizen Science Festival and hikes and talks where families can learn about everything from raptors to Native storytelling.

Recreation is also a portal to eco advocacy. Many people couldn't tell an ironwood from an amaranth, but they're intrigued by our local preserves. "So it's important for us to use of traditional recreation programs to introduce people to nature." Cardin says of the Maricopa Parks and Rec Department. "We'll do a fitness hike, but as we're doing that, we'll point out some of the plants along the trail, and people start to get an interest ... We need to get people down here and then work them through [the levels of knowledge], and then they become true advocates for open space."

"People feel great attachment to place here," McCue adds. "So I think if we can reach out and engage at all of these different layers of community, we're going to be successful. And this is very lofty, but I wrote this in the initial Five Communities proposal: We can be a model city for others around the world."

Schutz says the ROSS is a natural extension of Desert Botanical Garden's visionary founding 80 years ago. "[Just] as our founders were starting in the '30s, we—the Garden and the broader community—are just starting on that journey. And we can figure it out. It will take hard work, ingenuity, civil discourse. It will take a sense of [seeing] our mutual destiny—people and other species—as one. And to innovate and strive to find new ways to live in harmony with each other and with nature. And just as our founders had to trust that somehow the Garden would make it in year one and two, we have to trust in these efforts."





SONORAN QUARTERLY

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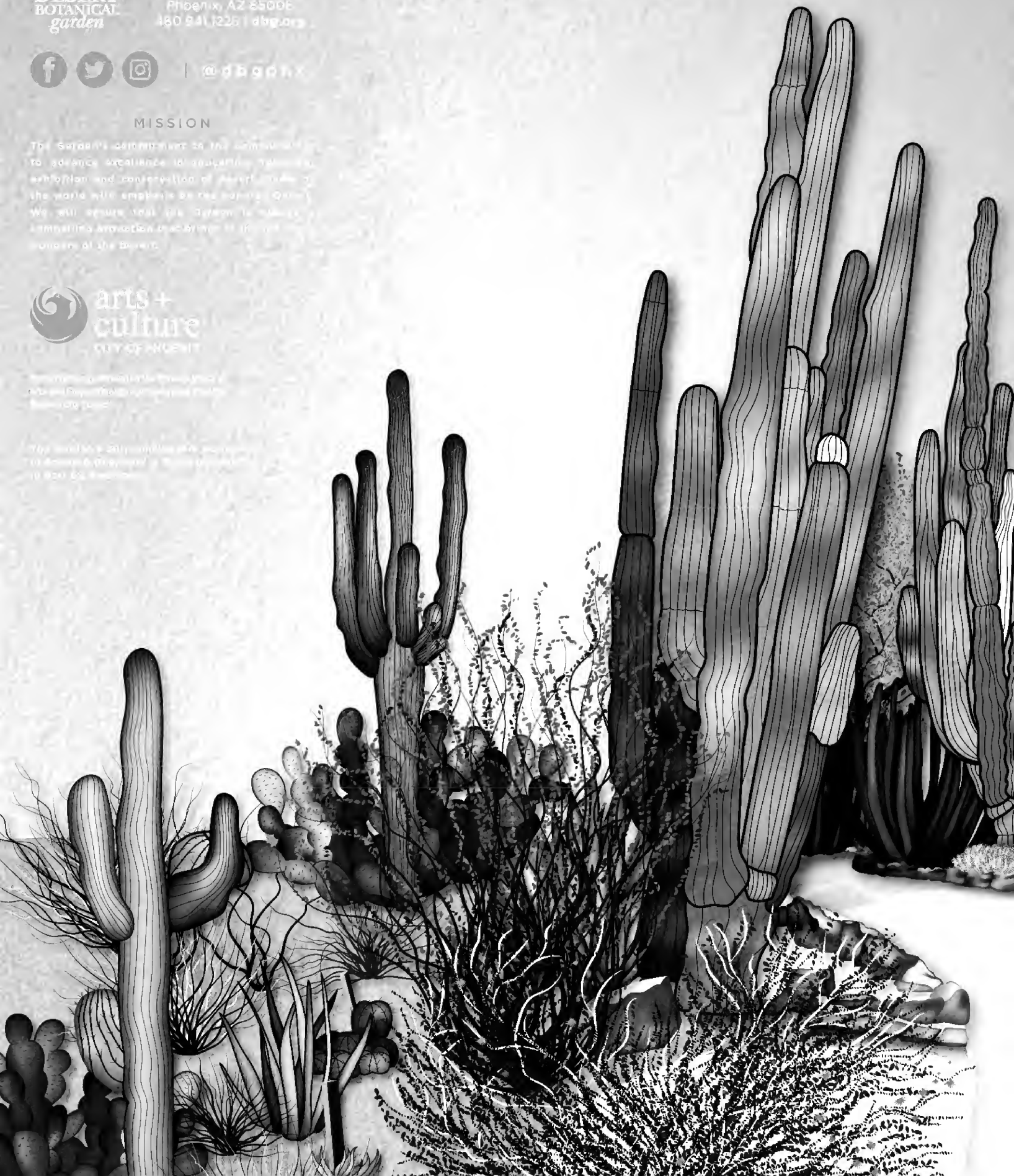
MISSION

The Sonoran Quarterly lives in the community to advance excellence in education, research, exhibition and conservation of desert plants of the world with emphasis on the Sonoran Desert. We will ensure that the Sonoran is always a compelling attraction and a source of inspiration for all visitors of the Desert.



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SONORAN QUARTERLY

SONORAN
QUARTERLY
SUMMER 2019

VOL. 73 No. 2

CRACKING ART
THE GARDEN **INVADES**

WE MADE ABOUT COVER ARTIST
PAUL COPPE

BUCKET LIST

A HEALTHY
DOSE OF
NATURE



DESERT
BOTANICAL
garden

Of Two Minds

I have mixed feelings about summer in Phoenix.

It gets so hot that sometimes I find myself pining for fall and winter. Then I stop and remember that it is never wise to wish time away. I really believe we should live our lives to the fullest every day, regardless of what the thermometer says. So in that spirit, we offer you this “cool” issue of the *Sonoran Quarterly*.

In the pages that follow, you'll find interesting articles that you can enjoy reading by the pool or in the comfort of your air-conditioned home. You'll learn about the Garden's ongoing sustainability efforts here in Arizona and around the world, our plans to showcase the work of new artists next season and our new membership program for emerging professionals.

If you have plans to travel to cooler climates, be sure to check out our recommended list of other “must-see” public gardens around the country.

On the lighter side, we share a recipe for a refreshing summer cocktail and introduce parents and caregivers to a fun way of teaching kids to use their imaginations as the ultimate form of summer fun and learning.

In seeking inspiration for this Desert Journal entry, it took just a few clicks until I was reading about the musical-opera “Porgy and Bess.” I learned that the lyrics to “Summertime and the Living is Easy” were written by DuBose Heyward. It made me think, “I bet he never lived in Phoenix in July!” And then I read that Ira Gershwin had written the lyrics for “It Ain't Necessarily So.” While I was quoting Gershwin completely out of context it made me think, “Now there's a guy who did spend a summer in Phoenix!”

With a smile, sending you wishes for a pleasant summer,

Ken Schutz

Ken Schutz

The Dr. William Huizingh
Executive Director



THE GARDEN IS
HERE TO HELP YOU
APPRECIATE
THE BEAUTY OF
THE DESERT AND
TALK ABOUT IT.



SONORAN QUARTERLY

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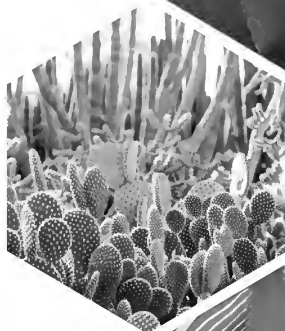
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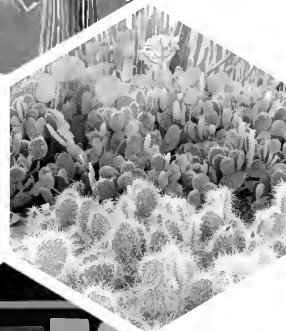
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WE WOULD LOVE TO HEAR YOUR FEEDBACK ABOUT **SONORAN QUARTERLY**. SEND US A MESSAGE VIA EMAIL AT SQ@DBG.ORG.

MAKE A *Cocktail* LIKE A PRO

Devour Phoenix Bartending Competition winner Samantha Hickman, a resident bartender at Windsor in central Phoenix, has spent the past three years honing her craft in mixology. After starting by studying craft beer, she developed a keen eye for flavor and unlikely combinations, ensuring guests a unique experience when they've got a seat at her bar. When she's not behind the bar she's spending time at home Downtown with her boyfriend and her dog, Max.

Samantha was the winner of the 2012 Devour Phoenix Bartending Competition, earning the title of Phoenix's Best Bartender.

Samantha's Summer

- 1 ounce gin
- 1 ounce Passoa Passion Fruit Liqueur
- .5 ounce fresh lemon juice
- .25 ounce Heering 200 cherry liqueur
- Shaken and strained into a tall glass
- Topped with 2 ounces sparkling wine
- Garnished with fresh raspberries and a mint sprig



CRACKING AND THE GARDEN



BY
LYNN
TRIMBLE

ART INVADES



More than 1,000 animals will invade the Garden this fall for a spectacular art exhibit called **Wild Rising by Cracking Art**. It's the work of Milan-based Cracking Art, a collective that uses large-scale sculptures made with recyclable plastics to spark wonder and joy, while inspiring important conversations about sustainability. The exhibit opens on Oct. 10, and will continue through May 10, 2020.

It's the first time Cracking Art has exhibited artworks in the Southwest, although you won't hear them put it quite that way. Instead, the artists use the term "invasion," which conveys both the monumental nature of their work and their concern for the ways plastics are invading the planet. **Wild Rising** couples ecological awareness with interactive art experiences, giving viewers a fresh way to celebrate the natural world.

"The term 'invasions' comes from the characteristics of plastic products, which have the effect of truly occupying spaces when produced in huge quantities," according to Kicco, a Cracking Art creative who recently spoke with the Garden about their work. "The feeling of being invaded is widespread among many contexts, including images, information, technology, products and human beings." Using large-scale plastic animals is the artists' way of shifting the meaning of the word to spotlight the possibilities of positive change through collaboration.

The invasion has already begun. We've been moving a giant Cracking Art snail sculpture around the Garden for many months now, giving visitors a sneak peek at what's to come. **Wild Rising** will include 11 different installations placed throughout the Garden to maximize the experience of discovery and awe. Visitors will see the brightly colored animals in playful settings—perching, climbing and peeking out from behind myriad plants.

The Garden's *Dr. William Huizingh* Executive Director Ken Schutz loves their whimsical, kitschy quality. He's excited about sharing the sculptures with visitors of all ages. "We're delighted that these artists chose to show their work here," Schutz says. They've done more than 400 invasions around the world, including Bangkok, Brussels and Moscow. "We can't wait to see all the fun ways people will react to this new invasion."

For most, this will be their first encounter with Cracking Art, which takes its name from the catalytic cracking that happens when raw crude oil gets transformed into plastic. "Their art evokes happiness, but it's also an intriguing foray into thinking about the changing climate and loss of biodiversity," Schutz says. "People have fun with it, but walk away being more mindful of the way they're using plastics every day."

"Their art evokes happiness, but it's also an intriguing foray into thinking about the changing climate and loss of biodiversity," Schutz says. "People have fun with it, but walk away being more mindful of the way they're using plastics every day."

Cracking Art creates site-specific artworks, so **Wild Rising** will be completely unique to the Garden. Knowing the Mexican Gray Wolf once prevalent in Arizona is now endangered, the collective is creating a group of gray wolves for the Garden but with a twist. A pack of colorful wolves will stand nearby, as if faithfully guarding their companions. Inside the Butterfly Exhibit, upright bear sculptures will stand amid the delicate fluttering creatures. Even penguins, meercats and snails will be part of the mix.

Animals are the perfect medium for helping people think about key issues. "Since prehistoric times, animals have been the first confrontation with nature," Kicco says. "Over time, we've attributed characteristics, power and messages to animals that have been useful for man to better imagine and understand the universe." Cracking Art ran with the idea, creating messages that accompany each animal they exhibit. Visitors will be able to read them as they make their way through the Garden.

Wild Rising continues the Garden tradition of exploring the intersection of nature and art, while raising poignant questions with playfulness and positivity. In recent years, we've presented installations by several international artists, including Dale Chihuly, Philip Haas, Jun Kaneko, Bruce Munro and most recently Klip Collective. And we'll be presenting fresh exhibits every year, for many years to come—each designed to fuel our visitors' imaginations and showcase the inherent aesthetic of the desert landscape.

For Schutz, the exhibition is one more way of realizing the Garden's vision of helping everyone care about protecting and sustaining the natural world for the benefit of future generations.

"Art can inspire us to be better stewards of the earth," Schutz says. "That's what it's all about."



WILD
RISING
BY
CRACKING ART

WILD
RISING BY
CRACKING
ART OPENS
TO THE
PUBLIC ON
OCT. 12,
AND IS ON
DISPLAY
THROUGH
MAY 10,
2020



SUSTAINABILITY *and* CONSERVATION *at the* GARDEN

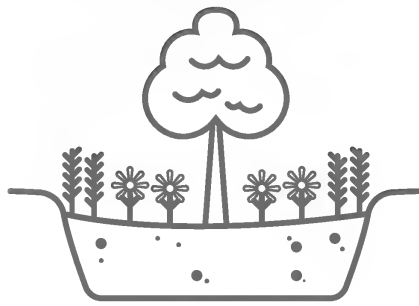
BY PATRICK SESTY

For 80 years, Desert Botanical Garden has grown into one of the most visited attractions in Arizona. More than 450,000 visitors from near and far come to see Desert flora up close every year, but did you know the Garden is at the forefront of conservation and sustainability?

Many of the plants we care for are rare, endangered or threatened. Some have been rescued (yes, you can rescue plants). A prime example are the organ pipe cactus on the Sonoran Desert Loop Trail. They were rescued from an old mine and some date back to the 1940s. *“Also, we are an oasis in an urban area, so we have a mitigating effect on the heat island issue,”* says Dr. Kimberlie McCue, director of research, conservation and collections.

GARDEN SUSTAINABILITY & CONSERVATION EFFORTS

BIO RETENTION BASINS



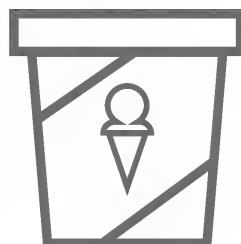
The average amount of water our basins can capture in one year is 878,000 gallons.

WATER HARVESTING



We have two cisterns that capture rainwater from the roof. Collectively, they hold 2,800 gallons. Water is used for propagating seedlings and other plants in the area.

STYROFOAM RECYCLING



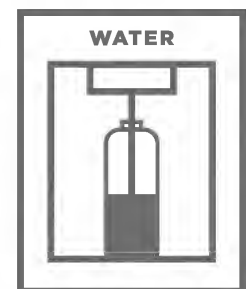
In 2018, the Garden recycled 608 cubic feet of Styrofoam, or 36,385.2 pints of ice cream.

SOLAR PANELS



We have a 113kW system with about 1,200 solar modules in operation—enough power to power 18 homes.

WATER BOTTLE REFILL STATIONS



Seven located throughout the Garden have helped eliminated tens of thousands of water bottles from landfills.

THE NEXT GENERATION OF SONORAN DESERT

BY KELSEY WOLF-DONNAY & KIM LARKIN

EMERGING *Leaders*

This year, the Garden launched Emerging Leaders, a philanthropic membership designed to engage the next generation of supporters 45 years and younger. Emerging Leaders will help shape the next 80 years of the Garden through their insights, passions and contributions.

This membership offers an opportunity for nature-loving emerging professionals, their friends and families access to the following benefits for \$40 monthly or \$450 annually:

- All core Garden membership benefits
- A special invitation to the exclusive Patrons Circle Plant Sale Preview & Picnic
- Behind-the-scenes tour to explore our conservation work

By being a part of this exclusive group, members receive an exclusive VIP invitation to three events annually, including the upcoming:

Succulents, Sips & Stories

SEPT. 19, 2019

Sit back and listen to curated stories from The Arizona Storytellers Project, the popular and often sold-out event series, with a VIP reception with Project Founder.

JOIN US | dbg.org/emergingleaders

This is a significant time in the Garden's strategic growth and evolution. We are fortunate to have some of the community's finest young leaders working to forward the Garden's mission.

Kim Larkin

GENERATION STEWARDS

MON- ARCH COUNCIL

Shaping the Garden's Future

Thanks to the foresight of Trustee Emerita Oonagh Boppart, an emerging professional has been serving on the Board of Trustees since 2008. This board member chairs the Monarch Council, a committee comprised of emerging professionals. The Council promotes civic leadership and community engagement by providing opportunities for participation in volunteerism, collaboration and leadership. Comprised of 12 individuals, the Monarch Council are ambassadors for the Emerging Leaders membership program, as well as serve on key Garden committees, participate in special projects and support the Garden's Strategic Plan. "These are the future Garden leaders and they can make a difference in our community," says Boppart.

Trustee Kim Larkin has served as the Council's chair since 2017 and has cultivated a group of diverse leaders from a variety of backgrounds and sectors.

Pictured (left to right, front to back):

Kathryn Honecker, Sarah Pirzada, Kim Larkin, Rea Mayer, Sara Schaefer, Kendon Jung, Salvador Bretts-Jamison and Cristi Pontius

Not Pictured:

Koy Mangan, David Martinez III, Linda Norquist, Robert Reder



Kim Larkin, Chair
Salvador
Bretts-Jamison
Kathryn Honecker
Kendon Jung
Koy Mangan
David Martinez III
Rea Mayer
Linda Norquist
Sarah Pirzada
Cristi Pontius
Robert Reder
Sara Schaefer

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Marion Donaldson
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Sandra Keely
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Jennifer Purcell
Shawnte Rothschild
Laine Seaton

STORIES FROM THE *Garden*



Whoever
said the
desert is
brown
and dead
has never
seen Paige
Poppe's
watercolor
paintings.

Paige Poppe

A POP-IN WITH PAIGE POPPE BY CLARE HAHNE

Poppe, who grew up in the Grand Canyon State, began painting while in college. What started out as a means to pursue creativity has blossomed into a full-time career as an artist, designing stationery, pins, stickers, prints and much more. Her aesthetic is unmistakable, featuring bright colors to capture the dynamic structure of desert flora and fauna.

Arizonans may have seen Poppe's work in boutiques around the Phoenix area, including La Grande Orange, Changing Hands Bookstore and West Elm, but her designs are also sold in California, Texas and Minnesota too. Recently several of Poppe's creative works became available in the Garden Shop, which has been a dream for Poppe—a longtime lover of the Garden. We took some time to connect with her on what it means to have her works featured in the Garden Shop and why the desert has become her muse.

How did you get started in your artwork?

Funny enough, I started by painting on skateboards. I had always been creative and loved to paint and craft, but this was my first pursuit in having a reoccurring art practice. I was in architecture school at the time, and while that was a creative major, I needed a creative hobby that was more loose and relaxing. My passion for painting bloomed, and eventually evolved into my desire to have a more signature style rather than being known as the girl who painted on skate decks. This desire coincided with my rediscovery of watercolor, which I had first picked up at age 12 but fell out of practice with, and a new appreciation for the desert. Watercolor was the perfect medium to pursue my ideas through, and it was around March 2015 when I felt that I had finally tapped into the art I was always meant to create.

What is it about the desert that inspires your vibrant artwork?

My appreciation for the desert hasn't always existed within me. I once found it brown and boring, and couldn't wait to explore a new state when I went off to college. It took time away for me to realize the beauty of our landscape here in Arizona, and when I returned one spring break from college, I saw the desert with new eyes. Now when I see the desert, I can barely turn off my excitement and ideas, because I'm blown away by the beauty. What I once found brown, I now find so colorful—you can find the entire rainbow within the desert, which is why I've named my signature collection "Technicolor Botanical."

What are some of your favorite desert plants to paint and why?

I am drawn to painting saguaros, ocotillos and organ pipe cactus. Desert plants are so sculptural to me, which makes them very interesting subjects for my art. Lately I've been fascinated with creating ocotillos, because I find that I can create a lot of variety in the way I draw and paint them. They are sculptural and interesting when viewed from afar, but equally as interesting up close with their harsh splitting barks that contrast the vibrant blooms that hang from the top.

Can you remember your first memory from the Garden?

I was lucky to visit many times for school field trips, and was always happy to go. I appreciate it even more now. One of my favorite memories from recent years was observing a roadrunner. They are so rare to spot and don't usually linger long enough to watch them, but I had the best time seeing one at the Garden.

Tell us how the Garden has played a role in your artwork and career.

I have always enjoyed working from photos when creating my art, so the Garden is a wonderful place for me to spend a day, gathering photos, sketches and notes. I can then later review whichever plant or composition I am drawn to at the time and really dive into the details and exploring the nature. Each visit to the Garden is always exciting and surprising, and it feels like you're visiting old friends and observing how they change with the seasons.

The Garden Shop features several of your pieces. What has that meant to you as a local artist?

Having my artwork available in the Garden Shop is so special and mind-blowing. The Garden is an Arizona treasure, and I love knowing that locals and visitors alike are spending a lovely day at the Garden, and then can find a little treasure of artwork in the shop afterward to take home and remember their visit. The Garden was also well-loved by my Grandma when she first visited Arizona, and it was a spot she always raved about.



BUCKET LIST

TO ADD TO YOUR SUMMER

BY DANA TERRAZAS

From big city adventures and mountain getaways to family trips to the beach, summer is a time to take in new sights, try new restaurants and unwind. As you plan your summer adventures, consider the amazing botanical gardens the U.S. has to offer.

Best of all, as a Desert Botanical Garden member, you score free admission through the reciprocal admissions program to almost all of these locations. Now is the time to check these gardens off your bucket list.

THE DESERT GALLERY AT THE HUNTINGTON

THE DESERT GARDEN AT THE HUNTINGTON

We know you love deserts and their plants, so this was a no-brainer for our list and just a quick 12 miles from downtown Los Angeles. The Huntington Library, art collections and botanical garden are known for many things, from a 15th century Gutenberg Bible to Thomas Gainsborough's portrait of *The Blue Boy* to a classical style Chinese Garden. Among all its treasures, one of the most famous is its collection of cactus and succulents. The Huntington's 10-acre Desert Garden showcases more than 2,000 different species. Hundreds more reside in the Desert Garden Conservatory and nursery. The Desert Collections are the institution's most important botanical research and conservation collection, containing a number of species that are now extinct.

SUMMER MUST-SEE:

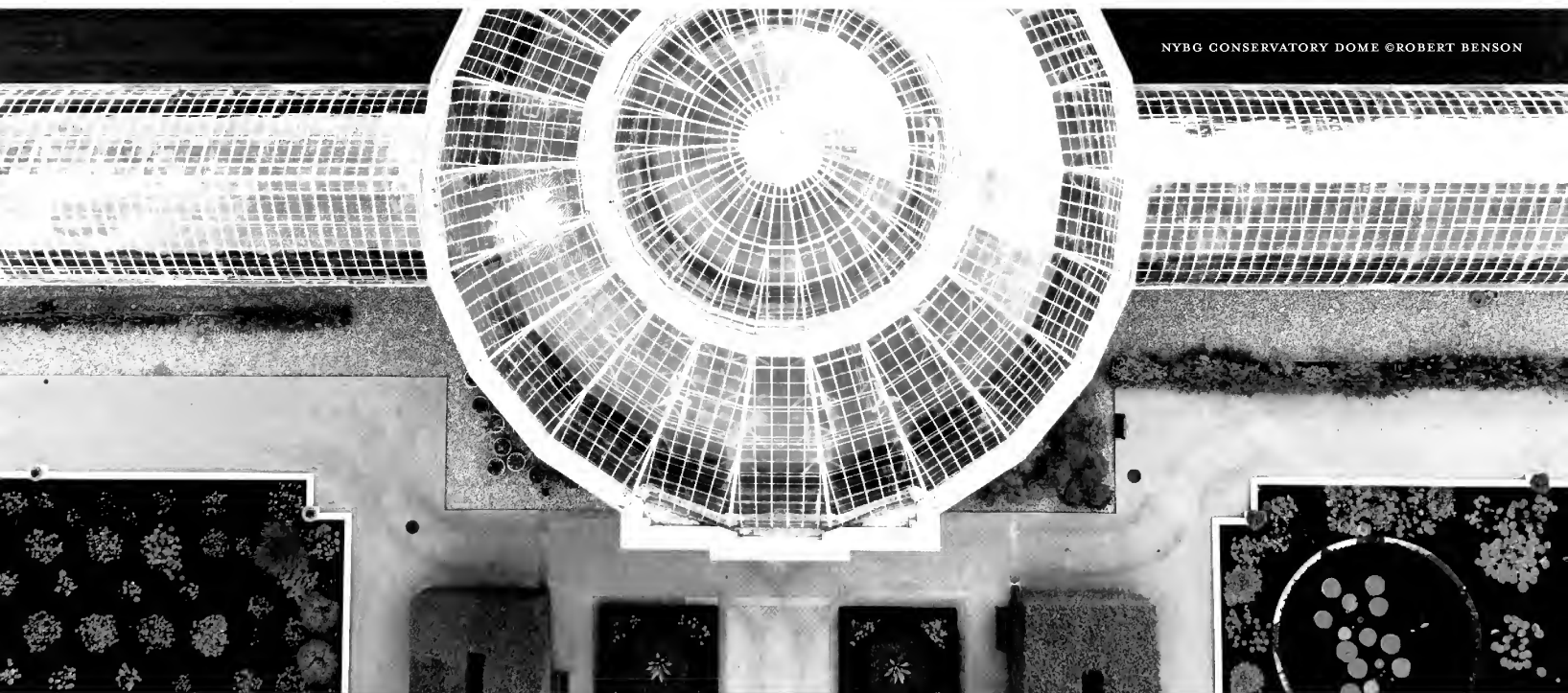
Check out the summer blooms on display with 20 to 30 species of yuccas in bloom and many species of flowering cactus (*Echinocereus*, *Trichocereus*, *Opuntia* and more).

HO'OMALUHIA BOTANICAL GARDENS

You came to Hawai'i for its stunning beaches, but it offers great botanical gardens too. Each is maintained with lush, indigenous flora, as well as exotic plants and trees from across the world. Located on O'ahu, Ho'omaluhia has a 32-acre lake, from which you can do catch-and-release fishing, framed by sprawling lawns, ideal for picnicking and relaxing. If time allows, there are three botanical gardens in O'ahu so check them out during your trip.

SUMMER MUST-SEE:

At the Na Hula Festival, celebrate the artistry and grace of Hawai'i's premiere dance form. This tradition has continued for many years, making it the longest-running, annual, non-competitive hula event in Hawai'i.



NYBG CONSERVATORY DOME ©ROBERT BENSON

NEW YORK BOTANICAL GARDEN

A trip to the Big Apple offers endless options of things to do. If you are looking for a way to step away from the hustle and bustle of the city, New York Botanical Garden is just what you need. This 250-acre oasis located in the Bronx has more than 1 million plants in more than 50 gardens. Garden highlights include the historic, Victorian-style glass house, offering a world tour of 11 distinct plant habitats.

SUMMER MUST-SEE:

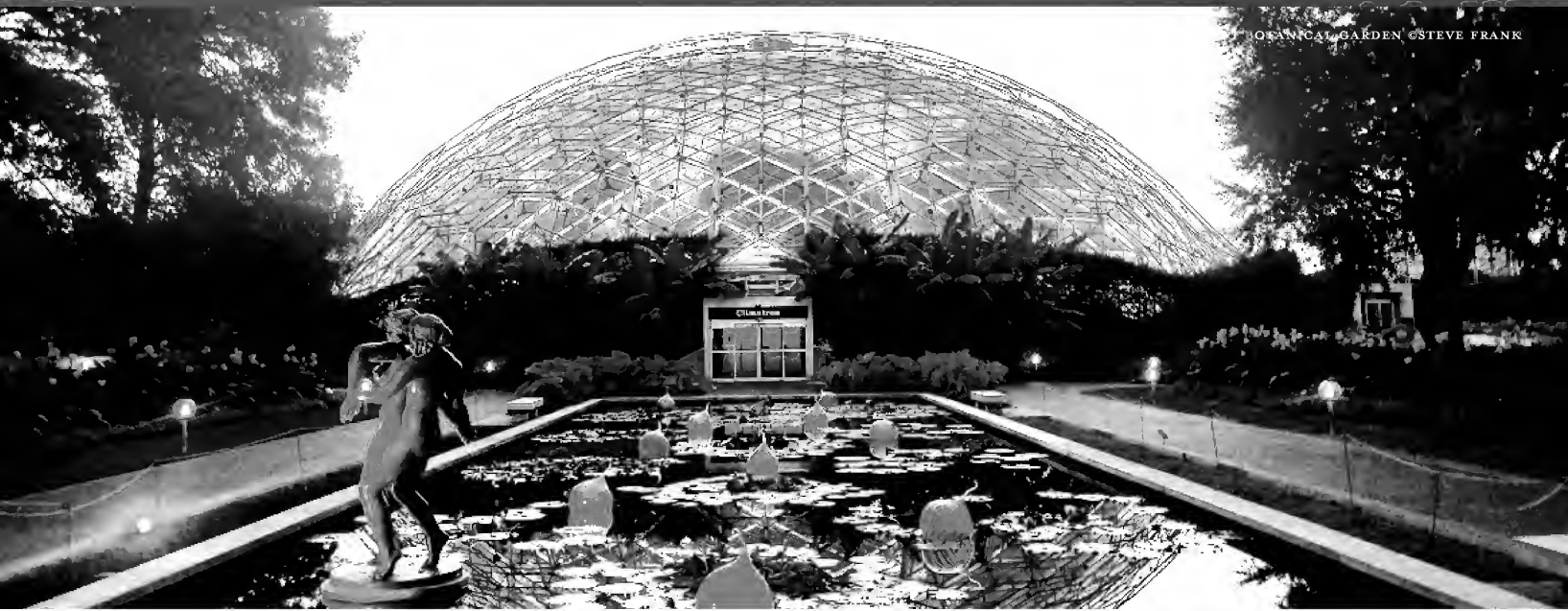
The Living Art of Roberto Burle Marx is a garden-wide exhibition that pays tribute to one of the most significant Brazilian artists of the 20th century and his contributions to plant discovery, conservation and garden design. The exhibition runs Jun. 8 through Sept. 29.

MISSOURI BOTANICAL GARDEN

With 79 acres of gorgeous displays, the country's oldest botanical garden is especially lovely in summer when so many beautiful flowers are blooming. Stop to smell the roses in one of their two exquisite rose gardens. Marvel at one of its several water lily pools, home to some of the largest variety of water lilies in the world. Explore the rainforest within the Climatron, or the Mediterranean atmosphere of the adjoining Temperate House. Stop in the Japanese Garden to take in some tranquility, or stroll through the Victorian District. Kids of all ages can have a blast in the Children's Garden, which features splash pads, climbing areas, a cave, slide, steamboat and hands-on activities.

SUMMER MUST-SEE:

On Wednesday nights in June and July, the Garden offers free concerts at its Whitaker Music Festival. Bring a picnic basket and a bottle of wine to make a perfect summer night.



MISSOURI BOTANICAL GARDEN ©STEVE FRANK

FAIRCHILD TROPICAL BOTANIC GARDEN

Sweet fragrances wafting in the warm breezes will remind you of dreams of paradise when you visit Fairchild Tropical Botanic Garden in Miami. Walk under the exotic Vine Pergola with dozens of beautiful flowering vines, including ones with sky-blue or jade-green and even candy-corn-hued flowers. Visit the Tropical Flowering Tree Arboretum to discover the allspice tree with quilted leaves smelling of the warm spice. Walk along the Laughed Spiny Forest of Madagascar and find yourself in a land of bizarre and beautiful plants collected by Fairchild scientists from around the globe.

SUMMER MUST-SEE:

The Mango and Tropical Fruit Festival in July is a summer favorite for visitors around the world.

ROBERT MAYER GARDENS & SCULPTURE PARK

Robert Mayer Gardens & Sculpture Park is a beautiful garden in the heart of the city. It features a large collection of sculptures by Robert Mayer, a renowned sculptor. The garden is filled with a variety of plants, including roses, hydrangeas, and other flowering plants. The sculptures are placed throughout the garden, creating a unique and artistic environment. The garden is open to the public and is a great place to spend a day in the sun.

SUMMER MUST-SEE:

The Robert Mayer Gardens & Sculpture Park is a beautiful garden in the heart of the city. It features a large collection of sculptures by Robert Mayer, a renowned sculptor. The garden is filled with a variety of plants, including roses, hydrangeas, and other flowering plants. The sculptures are placed throughout the garden, creating a unique and artistic environment. The garden is open to the public and is a great place to spend a day in the sun.

SAN DIEGO BOTANIC GARDEN

San Diego is a favorite vacation spot for Phoenixians, but how many of you have made a stop at the San Diego Botanic Garden? If not, this summer is your chance and a great stop for families with small children. San Diego Botanic Garden is a beautiful urban retreat nestled on 37-acres in the midst of Encinitas. Visitors enjoy restful vistas, flowering trees, majestic palms and the nation's largest bamboo collection. Thanks to mild Southern California climate, 5,000 plant species from all over the world thrive here. Its diverse topography provides a wide variety of microclimates, giving visitors the sensation of strolling through a tropical rainforest to hiking in the high desert. Four miles of trails wind through 29 themed gardens, including the acclaimed Hamilton Children's Garden.

SUMMER MUST-SEE:

Check out several family friendly festivals, including Fairy Festival, Insect Festival and Thursday Family Fun Nights.



PORTLAND JAPANESE GARDEN

This Japanese Garden features a strolling pond, tea garden, sand and stone garden, flat garden and natural garden. The reasons for building this Japanese garden were twofold: providing the citizens of Portland with a garden of great beauty and serenity while forging a healing connection to Japan on the heels of World War II. At this time in U.S. history, Japanese gardens were founded across the country as a way to build cultural understanding. Needing no translation, visitors can experience firsthand Japanese ideals and values communicated simply through nature.

SUMMER MUST-SEE:

Umami Café provides a place for you to relax and refresh while at the garden. Here you will experience the pairing of world-class Japanese tea with delicious edible delights.



A HEALTHY DOSE OF Nature

By Clare Hahne

Sunshine tingling the skin, earthy aromas wafting through the air, the song of a finch dancing through space—simply picturing the senses of nature has a destressing element. Instinctually we know that being surrounded by the outdoors has a healing effect, and in recent years, research has only confirmed this to be true.

Last year, the University of East Anglia published a report about how beneficial time outdoors is to human health. What the researchers found was that people who lived closer to nature or had readily accessible outdoor space had a reduced risk of Type 2 diabetes, cardiovascular disease, premature death and preterm birth, as well as increased sleep duration.

Physical health is not the only thing researchers have attributed to time spent outside. Stanford researchers published a study in 2015 that found people who walk 90 minutes in a natural area over an urban setting showed decreased activity in the part of the brain responsible for depression.

Richard Louv, journalist and nine-time author, says

the human connection to nature is ultimately about our ability to be fully alive.

“As we focus for hours on our screens, we and our children spend much of our time and expend much of our energy trying to block out most of those senses so that we can concentrate on the screens a few inches from our eyes. The point here is not to be against technology, which offers us many gifts, but to find balance—and to give our children and ourselves an enriched life and a nature-rich future.”

Garden members may recall Louv and his presentation at the Garden’s 2017 Annual Members Meeting, as he first coined the term “nature-deficit disorder” in his book “Last Child in the Woods” to describe the human costs of alienation from nature. He has been seen on the “Today Show”, CBS Evening News and NPR’s “Fresh Air”. He has also written for notable publications including *The New York Times*, *The Washington Post* and the *Times of London*.

The good news is that spending more time outdoors may not be so difficult in practice. Louv cites Harvard professor Edward O. Wilson’s biophilia hypothesis, which suggests that human beings are innately attracted

to nature, and that we need experiences in nature for psychological and physical health, as well as our sense of wonder. In other words, spending time in nature likely comes naturally.

“Research, experience and common sense suggest that our attraction to and need for natural landscapes and involvement with species other than our own is fundamental to our health, our survival and our spirit,” Louv says. “This connection is part of our humanity.”

As a direct result of this overwhelming quantity of research, medical practitioners have begun embracing these benefits. In fact, doctors in Scotland are now providing “Nature Prescriptions” to patients seeking qualifying treatment for mental illness, diabetes, stress, heart disease and more. These efforts are initiated as a means to utilize the healing effects of the outdoors in conjunction with the power of the human body.

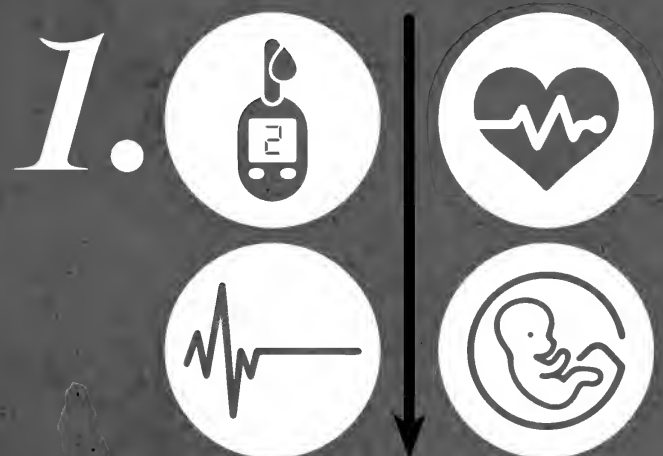
But how quickly can humans start to feel the effects of increased nature exposure? Louv cites another study from 2010. Jules Pretty and Jo Barton of the University of Essex published results in the journal *Environmental Science & Technology*, which reports that positive effects on mental health can be observed in as little as five minutes outdoors.

Louv says that more research needs to be done to determine how much total time people should be spending outdoors, but look for easy and enjoyable ways to weave in more time outside. He says

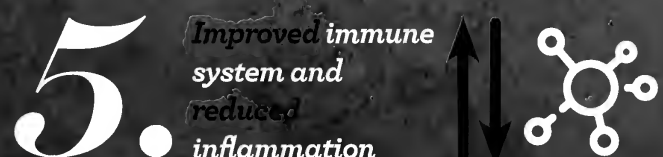
any green space will help to foster creativity and provide some benefit to mental and physical wellbeing.

“Connecting with nature can be as simple as planning regular walks around a local park, going on a picnic or learning how to garden in containers on the back stoop,” Louv says. “However, the greater the biodiversity, the greater the psychological benefits to people and the more restorative to the environment. Schedule outdoor time, direct experiences in nature; make getting outside in a natural area an intentional act—a healthful habit, if you will—that becomes part of your life ... I often share this as a rule of thumb with parents, teachers and others: Some experience in nature is better than none, and more is better than some.”

*Check out some
of the benefits
you may
experience with
time spent outside
according to a University of East
Anglia study*



Reduced risks of Type 2 diabetes, cardiovascular disease, premature death and preterm birth



CACTUS KIDS

THE WONDERFUL WORLD OF MUD

BY CELINA COLEMAN

It's safe to assume most adults would not place mud on a list of their favorite things. After all, mud stains clothes and gums up shoes and car tires, making it an overall inconvenience.

However, if you were to ask those same adults about their childhood memories of mud, the sentiments might be different. To children, mud is an adventure. Parents tend to dislike it, which makes it all the more alluring. They want to feel it in between their fingers and toes, listen to it squish or splash and watch it drip or ripple outward.

Mud, like other natural materials, has fewer constraints for children compared to store-bought toys. A modeling clay kit, for example, only offers limited possibilities.

It can be molded and shaped, but its consistency and color remain the same. The clay likely came with instructions and will eventually have to go back into the kit when it's time to clean up. It has rules—unlike mud. To a child, mud doesn't have an inherent purpose so their imaginations can run wild. It doesn't have to be played with in a certain way or be put back in a certain place. Children can add a little water and knead a mud pie or add a lot of water and make their very own mad scientist's potion. Mud can be a place to hide treasures, a jail for bad guys, an ocean or pit of lava to cross.

We invite you to reintroduce yourself to mud with the children in your life and let the muddy creativity flow.

PLANT POTION

SUPPLIES

- Bowls and other containers
- Spoons/mixing tools
- Leaves, flowers, sticks and other botanical materials
- Dirt
- Water
- Any other natural objects

INSTRUCTIONS

- Gather all the materials you will need to make your potion.
- Place all the ingredients into the mixing container.
- Mix together with the tool of your choice!

TIPS

- Encourage young children to think about where they would get their objects from and why they chose those ingredients.
- Have older children make predictions about what will happen next in their potion-making process or what will happen if they add more or less of certain ingredients.

BANKSIA TRACK

RESEARCH DOWN-UNDER
TO STUDY THREATENED
GROUNDWATER-DEPENDENT
TREE SPECIES

Western Australia is known for its scenic beaches, vast network of caves and award-winning wineries. But did you know it is also home to a remarkable diversity of plant taxa? This high plant biodiversity is supported, in large part by a collection of shallow aquifers, including one of the world's most extensive—the Gngangara groundwater mound. Located in the Swan Coastal Plain, the Gngangara mound supplies close to 50 percent of the drinking water of the city of Perth (by far the largest city in the expansive state of Western Australia). However, as Perth grows and its demand for potable water intensifies, the water levels of the mound have fallen dramatically in recent years. These depleted groundwater supplies are having a significant impact on many highly diverse ecosystems, including Banksia Woodlands (named after a genus of plant species in the Proteaceae family)—the most ecologically important and wide-spread forest type in the Coastal Plain. The impacts of groundwater depletion have been so profound that the Australian Ministry for the Environmental and Energy has listed Banksia Woodlands of the Swan Coastal Plain among the most endangered ecological communities in Australia.

Recently, the Garden's Plant Physiologist, Dr. Kevin Hultine, was invited by colleagues at Edith Cowen University, to participate in a study of the impacts of groundwater depletion on Banksia tree species. Dr. Hultine's 20 years of experience studying the various impacts of groundwater pumping, water diversions and drought on cottonwood forests is what brought him there. During the three months while in Australia, Hultine and colleagues shared research perspectives and conducted intensive field research that is still ongoing to better understand the sensitivity of groundwater-dependent vegetation to changes in available water.

If you have ever visited the expansive gallery cottonwood forests along the San Pedro River southeast of Tucson, AZ., or a similar desert river system of the Southwestern U.S., you are aware of what a classic groundwater dependent ecosystem looks like. Groundwater is the lifeblood of drought intolerant trees such as



Fremont cottonwoods, *Populus fremontii*, that thrive along vibrant river systems that support shallow water tables. The Banksia woodlands of Western Australia are analogues to the gallery cottonwood forests of the Southwestern U.S. in that they both support rich biotic communities of plants, animals, insects and microbes. Unfortunately they are both under threat for many of the same reasons—groundwater pumping, intensive land use and a changing climate.

Hultine and colleagues deployed many traditional measurement techniques and sensors plus new advances in environmental sensor technology to study water relations and drought stress in Banksia trees. As depth to groundwater fluctuates seasonally, these sensors—measuring tree water use, stem growth and leaf temperature every half hour—are able to detect the onset of stress before the trees show visible changes to their health and vigor.

The sensor array, which was installed November 2018, will continue to operate through 2019. These sensors will provide a wealth of information about the sensitivity of Banksia trees on the Swan Coastal Plain. In turn, this information will be used to better inform water managers and conservation biologists of the future threats of groundwater deletion on these woodlands and the biodiversity that they support. More broadly, results from the research will improve our knowledge of the threats to groundwater dependent ecosystems worldwide, including those supported by cottonwood gallery forest in the Sonoran Desert.



SONORAN
QUARTERLY

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MISSION

The Garden's commitment to the community is to advance excellence in education, research, exhibition and conservation of desert plants of the world with emphasis on the Sonoran Desert. We will ensure that the Garden is always a compelling attraction that brings to life the many wonders of the desert.



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All ages will have a blast during this self-guided nocturnal adventure through the Garden. Check out the night-blooming plants and animals that come out after dark.

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Flashlight TOURS



SONORAN QUARTERLY

SONORAN
QUARTERLY
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VOL. 73 N^o. 3

THE RESCUERS

Desert Nourishment

**CRACKING
ART'S
ARIZONA DEBUT**

WILD
WEDDINGS



**DESERT
BOTANICAL**
garden

EXPLORE THE GARDEN'S WILD SIDE

We've probably never had more fun putting together an issue of the *Sonoran Quarterly* than we did this time. What's the reason? Our newest art exhibition **Wild Rising by Cracking Art** inspired us to take a lighthearted look at different meanings of the word "wild." As you read through this issue, you'll see what I mean.

For my part, I wanted to focus on the Garden's "**WHY-Id**" side. Or ...

WHY-LD \ 'wī(-ə)ld\

Noun: the reason behind the Garden's impressive work to further its mission in Arizona, regionally and around the world.

Since day one, the Garden has stood as a champion for the conservation of wild Sonoran Desert plants and habitats. Eighty years later our commitment is stronger than ever.

Take for example our efforts to protect a tiny cactus that only grows on a small hill in New Mexico. In these pages, you will discover the work of our researchers to save this species from poaching.

And how are we setting the course for the future of conservation of wild desert plants? Read about how to raise a "wild child," as we share the benefits both physically and cognitively of nature-based play for children. You never know how small moments in nature might impact a child—maybe they will grow up to be a scientist at the Garden.

So when you think about what's wild at the Garden, always remember this: for the last 80 years and for the next 80 years, our top priority will always be protecting and conserving Arizona's wild natural heritage.

Come see for yourself, and explore the wild side of Desert Botanical Garden this fall.

Ken Schutz

Ken Schutz
The Dr. William Huizingh
Executive Director



**THE GARDEN IS
HERE TO HELP
YOU ENJOY THE
BEAUTY OF THE
DESERT AND
CARE ABOUT IT.**

SONORAN QUARTERLY

September 2019 Volume 73, No. 3

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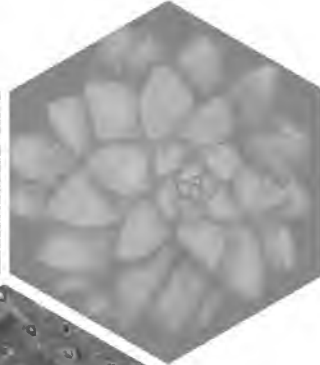
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ANOTHER *Dazzling* DINNER ON THE DESERT

By Dana Terrazas

On Saturday, April 27, more than 630 philanthropists, community leaders and Desert Botanical Garden friends gathered for the 33rd Annual Dinner on the Desert—the Garden's major annual fundraising event. The Garden exceeded its goal of \$500,000 in contributions to support all areas of the Garden, which is celebrating its 80th year of helping the community appreciate the wonders of the desert and protect it for future generations.

Dinner on the Desert had a magical outdoor setting under the stars and was chaired by Amy Flood and Larry West of Phoenix and Dana and Bruce Macdonough of Paradise Valley. Dinner was catered by Copper Square Kitchen/Hyatt Regency Phoenix, and the event featured musical performances by Teresa Joy, Rachelle Romeo Duo and Alex Oliverio Trio. Attendees bid on exceptional items at the garden-themed auction, which featured everything from plants and yard décor to artwork and jewelry.

The after-party featured **Electric Desert | A Light and Sound Experience** by Klip Collective, as well as a silent disco with VOX DJs.

Save the date for next year's Dinner on the Desert on April 25, 2020.

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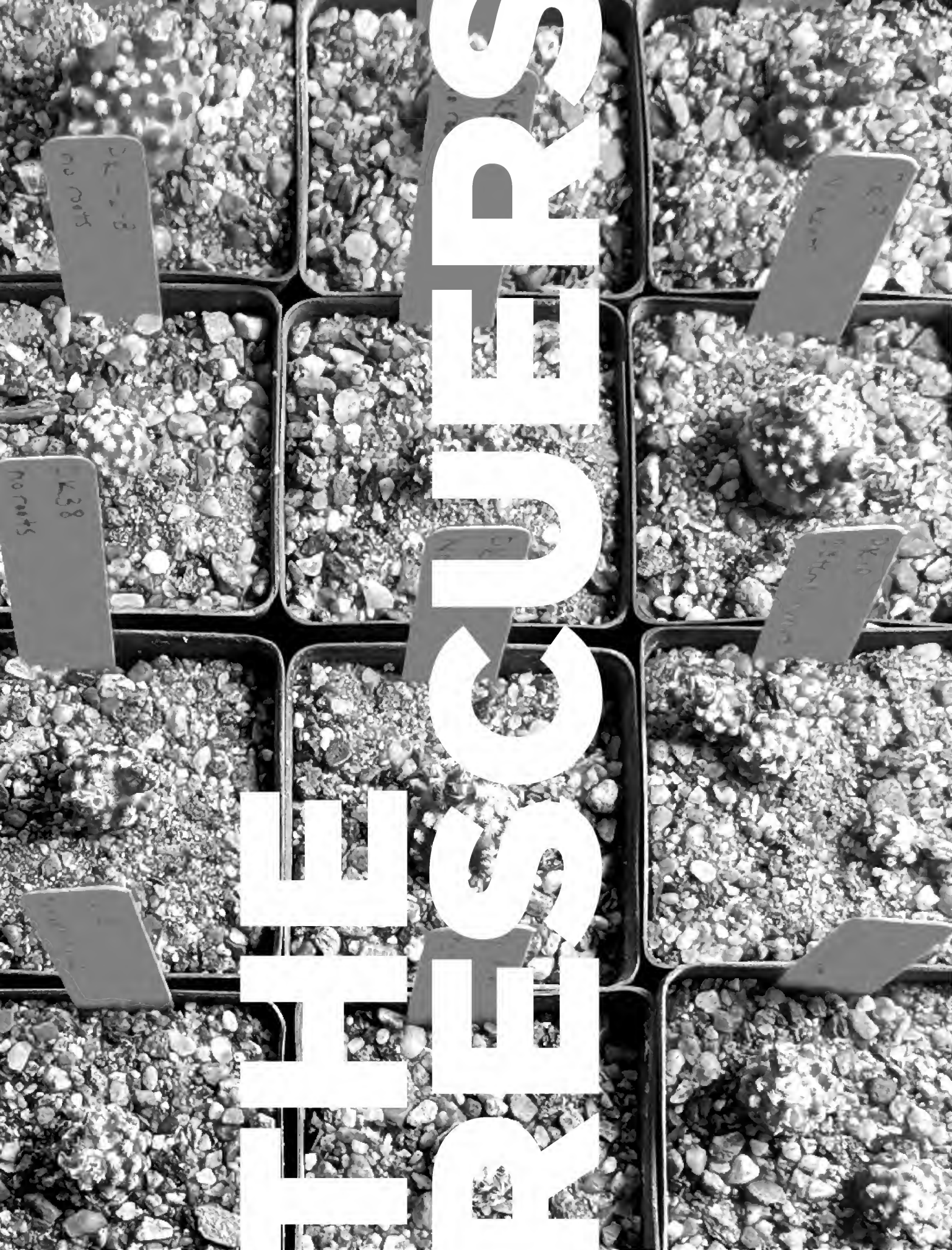
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Rancho Soledad Nurseries
Darra Rayndon & David Arrow
Relics Architectural Home & Garden
Rest Assured, Inc.
Riley Bea
Alan Rodney
Rusconi's American Kitchen
Sandra Luehrsen, S. Luehr Studios
Jennifer E. & Charles F. Sands
John P. Schaefer
Scott T. Schaefer
Tess Mosko Scherer
Schmitt Jewelers
Ken Schutz & Craig Thatcher
William & Mary Ann Sheely
Sheraton Grand at Wild Horse Pass
Sierra Bonita Grill
Southwest Home & Garden LLC
Ginger Spencer
Sphinx Date Co Palm & Pantry
Spinato's Pizzeria Tempe
Ann Stanton & Robert Haddock
Michelle Stitzlein
Studio Ressource LLC
Nancy Swanson
Kathleen & Stephen Taddie
Tank's Green Stuff
Tarbell's Restaurant
Tentacle Arts
True Brands
Thomas Tuberty - Tuberty Designs
Valerianne of Scottsdale
Village Health Clubs and Spas
Village Nurseries
Waterwise Botanicals
Cindy & Mike Watts
Kathleen & Bruce Weber
Dian S. Weisman
The Westin Kierland Resort & Spa
Emma Frow & Jameson Wetmore
& Mary Lu Wetmore
White House Design Studio
Wilde Meyer Gallery, Ltd.
Liisa & William Wilder
Jane & Stephen Williams
Wiseman and Gale Interiors
Marilyn Wolfe
Jennifer Woods
Robin & Stephen Woodworth
Jeff Zischke



By Keridwen Cornelius

In May, the United Nations issued a report from hundreds of experts, estimating that 1 million species could go extinct in the next few decades. A shocking one in four plant and animal species is at risk. Unlike Earth's previous five mass extinctions, which were triggered by catastrophes, ranging from massive asteroids to mega-volcanoes, the cause of this sixth extinction is us.

As alarm bells are ringing, Desert Botanical Garden's ongoing efforts in biodiversity preservation are becoming increasingly critical. "Since the beginning, we have been a conservation organization," says Steve Blackwell, the Garden's conservation collections manager. "Conservation is one of the pillars of this garden."

The Garden's conservationists are rescuing species from the brink of extinction through propagation and restoration initiatives, a new seed bank that houses nearly 5,000 seed collections and programs like the Great Milkweed Grow Out, in support of monarch butterflies. In addition, the Garden is partnering with the International Union for Conservation of Nature and the Smithsonian on several projects. Here are a few highlights:

PEDIOCACTUS

A 25-acre patch of land in New Mexico is the last stronghold of the ping pong ball-sized *Pediocactus knowltonii*. Around 60 years ago, the population of the commonly called Knowlton's cactus was 100,000-strong. Then in 1960, the New Mexico Cactus and Succulent Society feared the newly constructed Navajo Reservoir would flood the site. So they hastily carried off thousands of cactus. Bizarrely, the reservoir never came close to drowning the area, and no one knows what happened to the "salvaged" pediocactus.

Today, this critically endangered cactus numbers about 3,500 plants in the wild. Its rarity is doubly dangerous, because in addition

to rabbit predation, its main threat is poachers supplying a growing black market for uncommon cactus. "The sad thing is that as this plant has become more rare, it's put a bigger target on its head, because now the collectors want it even more," Blackwell says. Heightening the danger are the natural gas rigs that surround the pediocactus. Roads constructed to support the gas operations have made it easier for poachers to access the site.

Commercially grown pediocactus and their seeds are no longer available, and collecting seeds from the wild could further jeopardize the plant. So Daniela Roth—the botany program coordinator for New Mexico's Energy, Minerals and Natural Resources Department—reached out to the Garden for help. She is working with Blackwell, who has taken about 50 pediocactus cuttings from the area in New Mexico. He is propagating them at the Garden and storing their seeds at the *Ahearn* Desert Conservation Laboratory seed bank. In a few years, he'll reintroduce the plants at a different, secret location.

"Steve is very passionate about his work, and he has a background with pediocactus, not to mention his expertise at the Garden and the greenhouse they provided, even in the absence of funding," Roth says. "It was just a commitment to help this species that might be going extinct in our lifetime. I think our collaboration with Desert Botanical Garden really will enhance the chances of survival for the cactus. It's a huge step."

WILD \ 'wī(-ə)ld\
[*Adjective:* (of an animal or plant) living in a state of nature and not ordinarily tame or domesticated]

WETLAND PLANTS

The wetlands of southern Arizona are quite rare and are home to many species of plants that are found nowhere else. Threats from habitat degradation and groundwater pumping are further shrinking this habitat and endangering the species it harbors. Emblematic of a rare wetland plant is the endangered *Spiranthes delitescens*, or Canelo Hills ladies' tresses—one of about two dozen species of orchids native to Arizona. This orchid hadn't been seen in years before Blackwell and Garden research botanist Andrew Salywon sleuthed it out. As part

of a collaboration with the North American Orchid Conservation Center to conserve the orchids of the Southwest, they collected its seeds and are now working to collect the soil fungus it needs to grow. They are also working to protect the endangered Huachuca water-umbel (*Lilaeopsis schaffneriana* var. *recurva*) and the Arizona eryngo (*Eryngium sparganophyllum*), which grows in only two populations in Arizona—the San Pedro River and a mini wetland within a Tucson subdivision.





MONARCHS AND MILKWEED

In the last two decades, monarch butterfly populations have plummeted by as much as 90 percent. This iconic species is being decimated by climate change, habitat loss and herbicides that kill milkweed plants. Monarch butterflies lay their eggs exclusively on milkweed, and the plant is the only food of their caterpillars. In 2016, the Garden launched the Great Milkweed Grow Out to save monarchs. The Garden is planting milkweed at schools and community centers, plus encouraging homeowners to feature it in their yards. The Garden is also researching the 30 species of milkweed native to Arizona to discover which ones are best for monarchs.

The milkweed-butterfly partnership is a perfect jumping off point for discussing the web of interdependence that connects all species, Blackwell says.

“Every living thing has a role in the ecosystem. The world would be a lot less interesting without the diversity that we have, and losing one species can lead to a cascade of loss that we can’t even begin to imagine yet.”

Steve Blackwell

The United Nations report about imminent extinction may be alarming, but it also contains an element of hope, says Kimberlie McCue, the Garden’s director of research, conservation and collections. “If we humans are the primary threat, we can also be the primary solution. Desert Botanical Garden has been working to safeguard desert plants since 1939 and is better positioned than ever before to have a positive global impact through our work.”

McCue encourages you to visit cazca.org to learn about how you or your workplace can help conserve Maricopa County’s desert preserves.

Keridwen Cornelius is a freelance science and environmental journalist. Her work has appeared in *Scientific American*, *The Economist* and *Outside*.



1 PLANT SELECTION

While succulents typically prefer to grow outside, there are a few that can do better indoors than others. Ghost plant, zebra plant, snake plant, string of bananas and string of pearls are just a few of the species that can survive well indoors and look great in a variety of home designs. You can find these and many other indoor friendly succulents at the Garden's **Fall Plant Sale Oct. 18-20.**

WAYS TO SUCCEED WITH INDOOR SUCCULENTS

By Angelica Elliott

Home design magazines make it look so easy—a beautifully accented room with lush, delicate succulents perfectly placed throughout. They are dainty yet alluring, so it is no wonder why succulents are chosen to enchant spaces in the home.

Although succulents grow in varying conditions around the world, they can be finicky when gardeners attempt to grow them indoors. Luckily there are a few steps you can take to set up succulents for indoor survival, and it all starts with what plants you pick to pot.

2 SOIL MIX

Make sure to use high-quality potting soil when planting your new plant friends. Good potting soils are sterilized to keep insects and fungal diseases from contaminating the soil. Another way to ensure a proper base for succulents is by incorporating a one-to-one ratio of pumice to potting soil. This will assist with drainage during watering.



3 LIGHTING

One of the biggest indicators of succulent success is lighting. Succulents do best in bright light, which is typically up to 3 feet away from a window. Plants will show they need more sunshine through a process called etiolation, which is when they grow long, weak stems and smaller leaves. If the succulent starts showing these symptoms, move it closer to a window.



4 WATERING

There are several factors that influence how often succulents need to be watered, including growing season, container type and soil mixture. A good rule of thumb is to allow the soil to become almost dry between waterings. Always allow the water to run out of the bottom of the container to remove any salts that have accumulated in the soil mix.

[WILD \ 'wī(-ə)ld\]
Adjective: going beyond normal or conventional bounds

5 FERTILIZER

All potted succulents need to be fertilized with water-soluble or granular fertilizers. Make sure your fertilizer has nitrogen, phosphorus and potassium. The ratio of each major nutrient can vary or can be of equal amounts.

With these simple tricks, home gardeners can give their plant friends the best chance to grow successfully inside. If you have any questions about growing your potted indoor succulents, reach out to our Plant Hotline at planthotline@dbg.org.



DESERT

Nourishment By Chef MARIA PARRA CANO

For centuries, plants have been used as a source of medicine and food. Ancient peoples of the desert have relied on their relationships with plants as a means to sustain, heal and nourish themselves. Our ancestors created relationships with these plants as a way to harvest and share their nourishing elements in forms of oils, ointments and more importantly, food.

Did you know that many of these plants can be found in your garden and at Desert Botanical Garden?

As we take a walk around the Garden, we see such an amazing abundance of plant life that reflects back to our ancient relatives. We are reminded of how these plants can be beneficial to our bodies as a main source of food. Here are just a few examples:

NOPALES | Did you know the young pads of several prickly pear species can be harvested and consumed? They are high in fiber and help balance blood sugar levels. Their fruit can also be enjoyed in beverages as a simple “agua fresca” or can be sliced open and consumed raw. Fresh nopales are refreshing and can help cool the body during the summer months.

CHOLLA BUDS | After harvesting, the buds can be cleaned, cooked, dried and stored throughout the year, simply rehydrating in water as needed. Cholla buds are delicious when added to a simple pot of beans and add fiber to your meal. They can be combined with onions and garlic, which will boost the asparagus flavor.

ROSEMARY | Not only is this herb delicious when added to roasted vegetables, but it can also be made into a tea. Rosemary tea helps aid in digestion and is rich in vitamin C, vitamin A, magnesium, potassium and calcium to boost your immune system.

For five years, I have had the opportunity to use these magnificent plants while teaching classes for Garden members, volunteers and the community.

Plan on tasting Tostadas Verdes at the Plant-Based Ancestral Foods class or the Indigenous Foods for Overall Health class, coming this fall. This recipe combines distinct and revitalizing flavors, using fresh nopales. To sign up, visit learn.dbg.org.



Chef Maria Parra Cano is owner and "mami-preneur" of Sana Sana Foods. Maria works with local community groups to expand their knowledge of ancestral/traditional foods by providing community cooking classes, demonstrations and workshops.



Tostadas VERDES

WILD \ 'wī(-ə)ld\
Noun: a free or natural
state or existence

Servings: 12

INGREDIENTS:

- 1 pound fresh nopales, cleaned and diced
- 4 large avocados, peeled and diced
- 6 roasted green chiles, cleaned and diced
- ½ white onion, diced
- ½ sprig of cilantro
- 4 limes, juiced
- Salt and pepper to taste

INSTRUCTIONS:

1. In a large bowl, combine the diced nopales, avocado and chiles
2. Mix and add in the onion and lime juice
3. Season well with salt and pepper
4. Add in cilantro and combine
5. Serve over tostadas, or if you prefer, in a soft taco

CRACKING ART'S ARIZONA DEBUT

Meet the **COLORFUL** Critters of **Wild Rising**

By Andrea Denning and Clare Hahne

Desert Botanical Garden's trails are about to get more colorful—a kaleidoscope of creatures is invading this October.

The “invasion” titled **Wild Rising** is the Southwest debut of Cracking Art, an artist collective based in Milan. Their medium is recyclable plastic, which they shape into whimsical animal sculptures that have traveled the world to inspire greater stewardship of the planet.

Cracking Art, founded in 1993, named the collective after the process of converting raw crude oil into plastic, or “cracking.” The artworks appear unexpectedly in everyday places, inviting passersby to reexamine their perspectives.

The Garden has worked with Cracking Art to curate a dozen larger-than-life animal vignettes. The sculptures' brilliant colors and monumental sizes will capture the amusement of all ages, but Cracking Art hopes the creatures spark a deeper dialogue about environmental issues.

Take a sneak peek at a few of the sculptures invading the Garden this season to deliver their meaningful messages.

See these and many more creatures in the Garden beginning Oct. 12. Entry to **Wild Rising** is included in Garden membership, general admission and special event tickets.

Members can be the very first to see **Wild Rising** at our Member Preview Events Oct. 10 and 11. Reserve your spot by calling the member helpline at 480.941.3517.

CRACKINGART.

SPONSORED BY:



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Greeting our guests at the *Schilling* Entry Arbor, the “Frog Dome” army celebrates the life-giving properties of water. Garden friends will follow their call to environmental responsibility and empowerment.

PRAGUE, CZECHIA



Yes, these penguins do in fact have spines. “*Spheniscidea Mammillaria*” in the *Ottosen* Entry Garden may be a strange sight, but they symbolize a natural response to a prickly environmental situation.



What are fish doing in the desert? In a “Wave of Plastic,” schools of fish drive the gaze up. They symbolize swimming away from a potential future overrun by plastic.

INDIANAPOLIS, IN

Prolifically adorable, most gardeners know that too many bunnies can wreak havoc on an environment, yet “The White Rabbit” family gathered in the *Stardust Foundation Plaza* merely view the wonder of the Garden.

Crocodile tears is an idiom used to describe fake emotions, but “The Benefit of Tears” explores a crocodile’s tears as a precious liquid to sustain the surrounding plants.

Adjective: indicative of strong passion, desire, or emotion

The *Sybil B. Harrington Cactus Gallery* becomes the “Wolf House.” A pack of gray wolves are guarded by colorful counterparts, which is a tie to the local concerns about the diminishing populations of Mexican gray wolves.

Dazzling, metallic snails demonstrate the wealth and magnificence of nature with their shimmering patina. With their reflective protection from the sun, look for “Silver and Gold” to bling somewhere unexpected.

MILAN, ITALY

Nothing is cuter than the pointy snouts and attentive stance of a multi-colored mob of meerkats near the Garden’s Chihuly glass sculptures. “United We Stand” represents the importance of working together for the greater good.

Wild swallows adapt easily to urban settings, using synthetic structures as habitat. Co-existing in our desert setting, “Green is the Answer” shows these birds guarding their cactus-camouflaged eggs on the Desert Discovery Loop Trail.

WILD weddings

By Clare Hahne

Photographs by Robert Godridge Photography

[WILD \ 'wī(-ə)ld\
Adjective: deviating from the
intended or expected course]

Couples travel from around the country to mark one of the most important days in their lives surrounded by the beauty of Desert Botanical Garden. There is something about its Sonoran Desert scenery that truly captures the romance of a wedding day. The kaleidoscope of an Arizona sunset paints the sky, as couples gaze into each other's eyes, celebrating with their closest family and friends. Layers of textured cactus, agaves and aloes offer an exotic backdrop, yet creating

the sensation of being home. Wedding guests can experience all the earthy elements of the wild with the comforts of the Garden's exceptional service. In honor of its newest exhibition, **Wild Rising by Cracking Art**, the Garden challenged three local event planners to create a wedding arrangement inspired by the word "Wild," and their imaginations ran, well, wild.

Casey Green of Casey Green Weddings drew her inspiration for her table décor from the colorful sculptures, weaving in bright roses, leafy greens and deep blue linens. Eiffel Tower glass vases topped with multicolored feather bouquets catch the eye with an invitation to explore the sensational textures.



“My first reaction when I saw pictures of the new installation was to create a theme related to bright vibrant colors and animals,” Green says. “I wanted to convey a design that was loud, unexpected and acknowledged the lovely animals in the installation.”

She created a lush rose garden feel with the garland in the middle of the table, amongst the tall centerpieces. She also accented the table with a variety of gold animals to tie in Wild Rising.

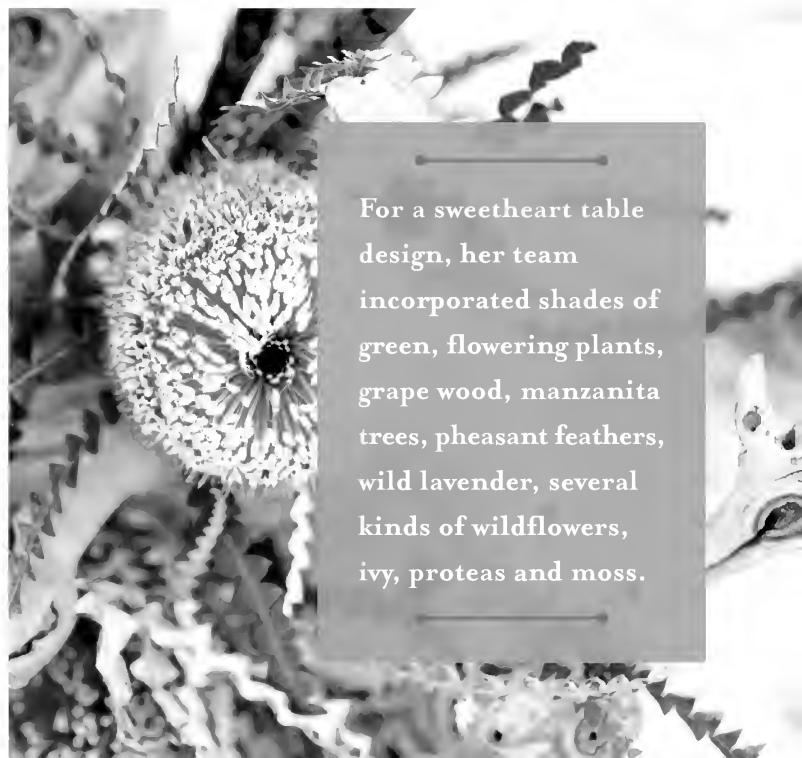




Lisa Foster of Stylish Events by Lisa said she was inspired by the definition of the wild—"living or growing in the natural environment; not domesticated or cultivated."

"My favorite part of planning weddings at the Garden is just being able to work with its natural beauty, you are able to expose your guests to a true Sonoran Desert experience at its fullest," Foster says. "It is so easy to design your decor off the plants and the environment the Garden already offers us."

“We thought about a wedding table that was in the wild or just in nature in its most natural form,” said Foster. “What would this table look like if we left it out in the Garden, and nature took over?”



For a sweetheart table design, her team incorporated shades of green, flowering plants, grape wood, manzanita trees, pheasant feathers, wild lavender, several kinds of wildflowers, ivy, proteas and moss.



Tasha Miller of Meant2Be Events created a ceremony setup in the Steele Herb Garden, and her goal was to bring animal and natural elements into the design, creating a modern desert safari.

Spot the lush, furry chairs and the animal-print rug to capture the wildlife element, while the wood, dried grass, eucalyptus, palm tree leaves and succulents add the natural feel to the design. Touches of gold top off the modern features.

“I love that each wedding we can customize to the couple,” Miller says. “We love bringing the couple's love story into the design.”



The setting of the Steele Herb Garden really made this design come to life,” Miller says. “The desert, palo verde trees and mesquite tree bring the vibe to life. Also, we used iron candle trees to enhance the wild desert feel.

”



Let the Garden be the setting for your next magical moment. Learn more about facility rentals for weddings, birthday and anniversary parties, memorial services and more at dbg.org, or reach out to Patrick Hanson at phanson@dbg.org.



RAISING A *wild* CHILD

By Celina Coleman

[**WILD** \ 'wī(-ə)ld\
Adjective: not subject to restraint
or regulation]

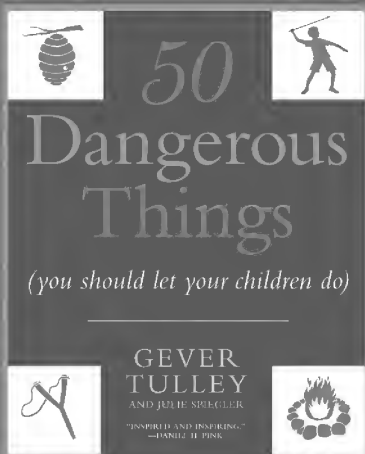
Being a parent in the digital age can be overwhelming. Answering the question of “what’s best for my child?” is just a tap away, and the results are endless. Social media is filled with trending articles and terrifying titles. One thing that doesn’t have to be overwhelming and a great way to overcome these stresses is time outdoors, playing, pure and simple playing. We suggest you let your child take the lead when it comes to play, and the Garden can offer the right place to engage.

The Garden’s programs provide opportunities that empower kids to go outside and decide how they would like to play. We let them see what happens when they’re presented with a tall tree and large boulders as objects of play, as opposed to technology or even conventional toys. We remove obvious hazards but allow for an exciting element of risk in our outdoor classrooms. As it turns out, letting children go a little wild can be hugely beneficial for their growth into a healthy, happy human.

Developing Critical Thinking

One of the early childhood education department’s goals is to offer more programs that help caregivers feel comfortable continuing outdoor play at home. The top two hesitations parents share with staff is that it is too hot outside or there are too many dangerous plants and animals. Our staff believes that children will not confidently learn to navigate those dangers if they are not frequently exposed to them.

Gever Tulley makes this the core focus of his book “50 Dangerous Things (You Should Let Your Children Do).” Giving children familiarity with risk teaches them their limits, helping them separate uncertainty from things that are truly unsafe. During one program this year, participants and Garden staff alike held their breath after a 10-year-old girl fell from a mesquite tree that she was climbing in our outdoor classroom. She was not hurt, but the shock brought her tears. Her mother hurried over,



Purchase “50 Dangerous Things (You Should Let Your Children Do)” in the Garden Shop.



made sure she was not injured and helped her calm down. Sharing a knowing look with staff, the mother turned and asked her daughter “What will you do differently the next time you climb a tree?” The girl, still wide-eyed, took a moment before responding, “Well, when I’m coming down, I’ll make sure my foot touches something before I let go.” Not only was she unafraid of getting back in the tree, she knew how to adjust the outcome.

Developing Strength

Children build strength when they use big muscle groups in a variety of ways. It starts with gross motor development for infants and toddlers and continues with older children, as they refine upper body muscles. Dynamic play in nature can actually help children develop in ways that can’t be matched indoors. In the last 15 years, the amount of time children spend outdoors has decreased by nearly 50%, while prescriptions for occupational therapy have been on the rise. Garden staff have noticed that children new to our programs, particularly those attending Sonoran Desert Adventure summer camps, are constantly fidgeting, fall down frequently or have difficulty keeping up. At the beginning of camp, often children whine that they have to “walk so FAR,” or make it a point to sit down when an adult is speaking.

In response to these trends, we schedule as much outdoor time as possible, even in the summer months. Each camp day is bookended by free-choice playtime outside with extra time built in after lunch. They are encouraged to climb trees, jump from rocks and stumps, dig holes and mini canals, and even scorch

wood with magnifying glasses. Campers also take daily 30- to 45-minute guided trail hikes (with water bottles in tow). Consistently, at the end of each week, those same campers whine when it is time to come back inside. This summer, one group established a “tadpole hospital” on the Plants and People of the Sonoran Desert Loop Trail and would scour the pond looking for toad eggs and new hatchlings. Campers also build things in our outdoor classrooms to help push their newfound abilities—one group even constructed and tested their own tree swing. Just a week of consistent outdoor activity makes a notable difference in their stamina. Imagine what a regular routine of child-led outdoor play could do.

It can be a struggle to watch children navigate the outdoors on their own terms. It is a learned skill that our staff and volunteers have developed, and we hope to help offer the same for Garden visitors. The Garden is thrilled to announce that we have received a grant from the U.S. Forest Service to build an outdoor nature-play space to be included with daily Garden admission and membership. After the success of *Cocoon* last spring, the Garden plans for this to be a permanent location that will serve as a forerunner to our highly anticipated *Myrna H. Berger* Children & Family Garden. We are partnering with Nature Explore, a division of Dimensions Educational Research, to design the space. Nature Explore is a nationally recognized nonprofit program with research-based, field-tested design principles to create dynamic, nature-placed learning spaces all across the country.

We plan to open this new nature play space in spring 2020, and it will feature a nature art space, dirt digging area, music and movement zone and more for you and the children in your life to experience and enjoy. We know caregivers will be amazed at their children’s capacity to learn from their own actions and grow stronger, smarter and more creative. Like anything else, going a little wild can take a little practice, but it’s well worth the risk.



A SECOND CHANCE FOR AT-RISK PLANTS

[Adjective: emotionally overcome]

The new *Hazel Hare* Center for Plant Science promised to transform the current horticulture infrastructure into a complex that supports the professional care of desert plants, provides a vastly more efficient and safe work space for horticulturists and researchers, and opens new opportunities for the public to experience and learn about the work of Desert Botanical Garden. Two years into the project and with Phase I behind us, the Garden is thrilled to see how the center has truly been a gift for the staff, plants and community.

In 2017, the Garden achieved a monumental milestone—opening the *Hazel Hare* Center for Plant Science—which would not have been possible without the generous support of donors who funded *The Saguaro Initiative*. One of the biggest elements of the new center was the construction of brand-new, state-of-the-art greenhouses to maintain the plants that struggled in the old structures. The Garden's old "hoop" houses presented safety challenges for staff and health concerns for some of the most precious plants in the collection. Many species are not native to the Sonoran Desert and had a difficult time surviving in the uncontrollable conditions of the structure.

Fast forward to today, and the new facility has not only met the outlined expectation of increasing the Garden's capacity to limit local extinction by growing plants and seeds in the Garden's collection, but many plants that were once struggling are now flourishing. Each of the three bays offers researchers and horticulturists the ability to control the structure inside to provide climate conditions similar to the environments where many of these plants grow, including Africa, South America, Mexico and Australia. Scott McMahon, *Cactaceae* collections manager, has seen first-



hand how the new spaces have allowed the plants to thrive in the Garden's care. "It was here [*Hazel Hare* Center for Plant Science] that many [plants] 'woke up' from an extended period of dormancy brought on by the hot dry conditions outside and the inadequate cooling in the old greenhouses," McMahon says. "Many of the them are growing and flowering again. These new greenhouses have made it possible to seek out and acquire new cactus for our collection that we could not consider before."

The new greenhouses have helped the Garden's conservation team work with rare species by providing conditions much more suitable for growing out plants year-round. "Previously, I would have to wait for outside conditions to be conducive for propagating, which would limit me to two very short windows in the spring and fall," says Steve Blackwell, conservation collections manager. "Now I can propagate a wider range of species all year. Having the ability to moderate the temperatures has made my work so much easier and more efficient than ever before, which allows us to expand my work with rare species. We are able to produce healthier happier plants throughout the year."

Take a look at a few of the plants that are settling in nicely in their new greenhouse homes.

***Tephrocactus bonnieae*:**

This endangered species is from Catamarca, Argentina, and grows within an area of 20 square kilometers. Because it is so rare, it's under threat from poaching. This plant is developing successfully in its climate controlled space at a comfortable 80 degrees and has bloomed for the first time since it came into our care in 2014.

Pterocereus (Pachycereus)

***gaumeri*:** An endangered plant from the Yucatán, this species is experiencing population decreases due to agriculture and urban development. This was housed in the hot, old greenhouse, where it hardly ever blossomed. Today, its loving the humid environment in *Marta Morando & Bill Moio* Greenhouse West Bay 2, and it has been growing and blooming vibrant green blossoms.

***Haageocereus tenuis*:**

This species is perhaps the rarest in the family, occurring within an area of less than one square kilometer off the coast of Peru. It grows over mounds of sand that receives no rainfall, only the fog which rolls in from the coast. It is listed as critically endangered—the last step before extinction—and is threatened by pollution and poaching.

If you would like to see the greenhouses firsthand, book a free Behind-The-Scenes tour of the *Hazel Hare* Center for Plant Science. Tours run Tuesdays through Thursdays Oct. 1 through May 7 at 10 a.m. and can be reserved through Admissions on the day of your visit or at dbg.org.

THANK YOU

for supporting the Garden's Trustee Matching Gift Challenge!

In honor of the Garden's 80th anniversary on Feb. 12, 2019, eight Trustees created a Matching Gift Challenge to encourage new and increased charitable gifts to support the Annual Fund. Nearly 700 individuals and families generously responded to help exceed the goal of \$260,000.

We are grateful to our Annual Fund donors for supporting the Garden's signature programs like Sonoran Desert Adventure for Title I schools, helping fund our plant scientists work in the lab and in the field, encouraging our talented horticulture team and providing the resources needed to care for the Garden's world-class collection of more than 126,000 seeds, herbarium specimens and plants, including the rare cactus highlighted in this article.





SONORAN
QUARTERLY

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Phoenix, AZ 85008
480.941.1225 | dbg.org



| @dbgphx

MISSION

The Garden's commitment to the community is to advance excellence in education, research, exhibition and conservation of desert plants of the world with emphasis on the Sonoran Desert. We will ensure that the Garden is always a compelling attraction that brings to life the many wonders of the desert.



Partial funding provided by the Phoenix Office of Arts and Culture through appropriations from the Phoenix City Council.

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FALL MUSIC IN THE GARDEN

OCT. 4 - NOV. 22 | 7 - 9 p.m.

OCT. 27 | 5 - 7 p.m.

Desert Botanical Garden presents a spectacular lineup of talent at Music in the Garden Fall Concert Series. Elevated at the base of a giant, *Ullman Tower* is an unmatched backdrop for audiences to enjoy the sounds of beloved favorites and find new talent.

MUSIC in the GARDEN

Sponsored in part by:



- | | |
|---------|--------------------------------|
| Oct. 4 | The Sugar Thieves |
| Oct. 11 | Blaine Long & Rosas del Rey |
| Oct. 18 | Blue Bayou Show by Big Zephyr |
| Oct. 27 | Traveler |
| Nov. 1* | Guitarras Latinas |
| Nov. 8 | Mother Road Trio |
| Nov. 15 | Rose's Pawn Shop |
| Nov. 22 | Big Nick and the Gila Monsters |

Tickets subject to availability.

SAN ONO RAN

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QUARTERLY
WINTER 2019

VOL. 73 No. 4

Reduce Your Water Footprint

A GRAND ALLIANCE

**A BACKSTOP
TO EXTINCTION**

*A Chat with
Arizona
Wilderness
Brewery*



DESERT
BOTANICAL
garden

Deserts are defined by their water scarcity, and desert plants and animals have evolved amazing adaptations to thrive in them. Likewise, as two-legged desert dwellers, we also have become adept at living in a place where annual rainfall is limited, and water must always be treated as a precious resource.

This reality is made all the more evident by changes taking place in the world around us: Phoenix is one of our country's fastest growing cities; we are living in a period of prolonged drought; and global climate change poses stark new challenges for everyone.

It is in this context that we devote much of this issue of *Sonoran Quarterly* to the topic of water in the desert. In the pages that follow, you can read about water management and conservation in our state. Learn how to hone your desert gardening skills with an eye on reducing your H2O footprint. And there's also a feature article about our favorite watering holes in the Garden—where the judicious use of water adds beauty and delight to a stroll through the Garden.

We hope you enjoy this issue of *Sonoran Quarterly*, and, as always, thank you for your support of the Garden and the work we do to protect desert plants and conserve desert habitats.

Wishing you all the best in 2020.

Ken Schutz

Ken Schutz

The Dr. William Huizingh
Executive Director



**THE GARDEN IS
HERE TO HELP
YOU ENJOY THE
BEAUTY OF THE
DESERT AND
CARE ABOUT IT**

SONORAN QUARTERLY

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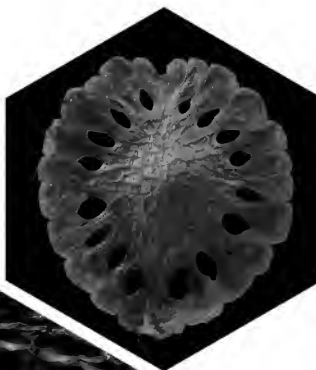
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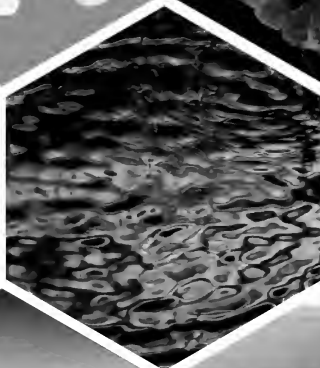
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THINK & DRINK

We would love to hear your feedback about *Sonoran Quarterly*. Send us an email at SQ@dbg.org.

A large, white, textured sculpture of an elephant stands on a white rectangular platform in a bright gallery space. The elephant is facing left, with its trunk slightly curved. In the background, there is a large window on the left and a wall with a pattern of dark circles on the right. A curved banner at the top of the image contains the text "In nature, nothing exists alone." in a bold, sans-serif font.

In nature, nothing exists alone.

By Lauren Warren

ELEPHANT IN THE ROOM

There is an elephant in the room—a gigantic, majestic creature, which has taken over *Ottosen Gallery*. This and many more whimsical and unexpected creatures are part of **Wild Rising by Cracking Art**—on display now at the Garden.

Expanding on the American metaphorical idiom, referencing an obvious problem that no one wants to tackle, the **Elephant in the Room** is a thought-provoking installation that invites visitors to dig into rotating topics related to biodiversity and climate change. Launched alongside **Wild Rising**, the interactive display seeks participation and feedback from visitors of all ages and intends to prompt discussion about positive change and human impact in the natural world.

Included in the space this fall was an installation by *Illegal Arts*, a New York-based artist collective that explores human connection through public art. "Connect the Dots" asked visitors to make a continuous line through a variety of choices—starting with the first circle "me" and ending with "us"—illustrating each participant's shared commonalities and celebrating their differences.

Encouraging notes and commitments to positive change have been recorded daily by visitors, acknowledging their shared hopes for the future. **Elephant in the Room** continues through spring with new topics and engaging interactive experiences regularly added.

A Backstop to

By Clare
Hahne

turner



Those infatuated with the Sonoran Desert recall the allure of towering saguaros, the herbal smell of creosote and verdant trunks of palo verde trees. The unfortunate truth is that this fragile biodiversity is enduring various threats from humans to climate change, and the landscape of the Sonoran Desert could look very different should any of these plants go extinct.

Now for the good news: Desert Botanical Garden's newest scientific facility is one giant step forward to protect desert plants of the Sonoran Desert, as well as from around the world. Thanks to the generous donation of Susan and Bill Ahearn, the doors opened this summer to the *Ahearn* Desert Conservation Laboratory (DCL), a milestone on the path to the Garden becoming a premier desert research facility.

The Garden began collecting and maintaining seeds of rare, threatened, and endangered plant species in the early 80s as part of a national network of botanical gardens that founded the Center for Plant Conservation. A seed vault was constructed to house the seed collection. Over time though, that structure's integrity deteriorated, and it was dismantled in 2015. The seeds were placed in a new freezer that was housed in the Garden's molecular lab.

Susan Ahearn has been a Volunteer in the Garden since 1988, and she saw firsthand the limitations of the previous space, having worked much of her 16,000 volunteer hours assisting with conservation, the herbarium and field work. Susan and her husband Bill generously offered to fully fund the DCL, moving forward one of the most advanced seed bank labs at a botanical garden and the only one specializing in Sonoran Desert plants.

So how have Garden scientists begun utilizing the new seed bank? Steve Blackwell, conservation collections manager, and other Garden scientists have not wasted a minute putting its state-of-the-art technology to work for the protection of desert plant seeds. Blackwell describes the seed collection as a "backstop to extinction"—an insurance policy to protect and preserve desert seeds. As populations of species dwindle, the Garden can use stored seed in restoration projects, maintaining precious desert habitats around the world. The new lab is instrumental in work that the Garden is doing to photograph, test, store and germinate desert seeds. One example of a species that the Garden has managed to help by utilizing the new seed bank is the *Pediocactus knowltonii*. *Sonoran Quarterly* readers may recall from the fall issue the work that Garden scientists have done to save this tiny



cactus that only grows on a 25-acre patch in New Mexico. Compared to a saguaro fruit, which can produce more than 1,000 seeds, *P. knowltonii* can only produce between four and 20 seeds in a single fruit. With such small numbers to work with, diversity of the seeds becomes a hurdle in securing the fitness of this cactus. The Garden can collect and store these precious seeds and germinate them all within the new DCL to later reintroduce them back into a safe place in the wild.

Blackwell also collaborates with outside organizations interested in conserving and learning about seeds. The Garden has agreed to serve as the Southwest regional orchid seed bank for the North American Orchid Conservation Center. Another example is a partnership with the Chiricahua Desert Museum and the Phoenix Zoo, which had the novel idea of testing the viability of seeds eaten by rodents later digested by snakes. Together they are hoping to answer the question if snakes can serve as seed dispersers. This work is all possible thanks to the opening of the DCL and a new germination chamber, which was generously donated by Garden volunteers Steve and Jane Williams.

This is only the start of the work that is being done in the new DCL, and scientists are thrilled to see all the possibilities of the new lab.



Garden Philanthropists Honored

On Nov. 6, Garden volunteers and donors Susan and Bill Ahearn received the Association of Fundraising Professionals 2019 Outstanding Philanthropist award from the Greater Arizona Chapter. Friends from Arizona PBS, ASU Gammage, Grand Canyon Conservancy and Lowell Observatory joined Garden leaders in nominating Susan and Bill for this prestigious honor, which celebrates their generosity and dedication to Arizona's exquisite landscapes and culture.

The Garden also honored Board of Trustees Past President Shelley Cohn with its Spirit of Philanthropy award, recognizing her leadership and significant contributions.

Photos

Bottom Left: Left to Right: Executive Director Ken Schutz, Susan Ahearn, Bill Ahearn at the DCL Ribbon Cutting Dedication.

Top Left: Andrew Salywon (left) shares cactus specimens.

Top Center: *Pediocactus knowltonii*

Bottom Center: Bill Ahearn (left) demonstrates part of the seed cleaning process at the DCL dedication.

Right: Left to Right: Beverly Duzik, Susan Ahearn, Shelley Cohn, Mollie C. Trivers



ENCOUNTERING WATER

AT DESERT BOTANICAL GARDEN

BY CELINA COLEMAN

The Garden staff always hope visitors will return with a thirst to learn more. Remarkably, one of the things that sparks the most curiosity is water. Previous visitor research showed that water is a key topic of interest to audiences across all demographics. Though it might not be immediately apparent, the Garden is truly centered around water. Our vast collection of cactus, agave and other plants can't survive without it. It provides much needed sensory respite, serves as a gathering place for animals and encourages keen scientific exploration. Here are a few of our favorite water features to experience during your next visit.

CENTER FOR DESERT LIVING TRAIL THEOBALD FOUNTAIN & RAIN BARRELS

Nature sounds can have a profound restorative effect on our nerves. Studies completed at Stockholm University and Brighton and Sussex Medical School have found that listening to things like wind in the trees or running water calms the systems that trigger our “fight or flight” reflex—essentially the mechanisms that cause stress and anxiety. The fountain honoring John O. Theobald II on the Center for Desert Living Trail provides an opportunity to focus to the sight and sound of bubbling water to relax.

Just east of the fountain sits one of the Garden's active water harvesting systems. The large brown tank is a rain barrel, collecting and storing runoff from the roof of *Archer House* to water the wide variety of plants on this trail and helping the Garden with its goals of environmental and economic sustainability. Though Phoenix only receives an average of 9 inches of rain per year, the square footage of the building plus the capacity of the cistern allows for nearly 5,000 gallons of rain water to be collected annually. With the winter rainy season approaching, this barrel will soon be put to good use.

HARRIET K. MAXWELL DESERT WILDFLOWER LOOP TRAIL

SHADE GARDEN

This trail is a natural stop for many of the Garden's most popular pollinators, including honey bees and butterflies. Not only can they find a variety of food sources in the flowers, they can also find water. The Shade Garden, located between the Bee and Boulder Gardens, hosts a fountain and a small pool under the broad canopy of a mesquite tree. You may still see bees hovering nearby, even in the winter months. These buzzing insects find this spot particularly helpful in the colder weather, as they collect water to help dissolve crystallized honey in their hives.

PLANTS & PEOPLE OF THE SONORAN DESERT LOOP TRAIL

DESERT OASIS

The largest and most dynamic water feature in the Garden is the pond in the Desert Oasis section of the Plants & People of the Sonoran Desert Loop Trail. Visitors can use their eyes to search for snails, fish and dragonflies, moving through the water. If you prefer a challenge, try to scan for great horned owls in the cottonwood trees nearby. Many of the pond's critters hibernate in the winter, but you might see Woodhouse's toads start to emerge as early as late January or February.



Theobald Fountain



Shade Garden



Desert Oasis

Take a look at these upcoming classes and workshops for more opportunities to discover water at the Garden.

For more information, visit dbg.org/learn.

SEEDLINGS

Jan. 7 - Feb. 14 | 9:30 - 11:30 a.m.

Tuesdays, Wednesdays, Thursdays or Fridays

Children ages 3 to 5 and their caregivers explore the wonders of our desert through nature-based activities and guided walks on the trails.

THE MIGHTY COLORADO RIVER

Sunday | Feb. 9 | 10 a.m. - noon

Travel down one of the world's great rivers from the first trickle to the final delta through this fascinating presentation. Explore the rich past from dinosaurs and prehistoric cultures to fur trappers and river runners in this epic exploration of the Mississippi to the West.



A GRAND ALLIANCE

As Grand Canyon National Park celebrates its centennial, we reflect on its longstanding connection with Desert Botanical Garden, involving intrepid collectors, water conservationists and citizen scientists.

BY KERIDWEN CORNELIUS



Something about Wendy Hodgson's life seems, fittingly, to parallel plants. As the Desert Botanical Garden botanist talks about her work in the Grand Canyon, her story weaves together like the web of roots and fungi, connecting Arizona's flora.

The seeds of her tale are four convention-breaking female botanists who braved the Colorado River and trekked through the desert at a time when society frowned upon adventurous women scientists. Their accomplishments took root and stretched into the future, touching Hodgson and inspiring her to study succulents in the Grand Canyon and throughout the Southwest. In turn, Hodgson's and her colleagues' efforts are branching out to citizen scientists who collect data on the Canyon's natural springs and promote biodiversity. The actions of all these plant-lovers will bear fruit for decades to come.

"This work is multigenerational," says Hodgson, who is also the Garden's herbarium curator emerita. "You can't get it all done in one lifetime, especially when you're trying to answer a lot of questions in such a big place like the Grand Canyon. What species are there? Are there new species there? Are they rare? Are we losing them? What affects them? And how did they

arise?" The Garden is perfectly positioned to help answer these questions. For decades, the Garden has been involved with numerous collaborations aiming to study and conserve the Grand Canyon's 1,700-plus plant species. In addition, fittingly, the connection between the Garden and the national park branches back to one of the four women who influenced Hodgson: Rose Collom, a founding member of the Garden.

Collom's botany career blossomed out of the compost of loneliness and boredom. Born in 1870 into a wealthy family in Georgia, Collom moved to Arizona at age 44 when her husband got a mining job. Suddenly she found herself in an isolated cabin in the Mazatzal Mountains with nothing to do. She thought she would go crazy. Instead, she taught herself botany. Eventually, she became the Grand Canyon's first paid botanist, collecting more than 800 species and donating many of them to the Garden.

"I wish I could've met her," Hodgson says. "She struck me as this very kind, quietly dedicated and very strong woman to go out into the wild and live and study plants. And she felt like everything was a miracle in the plant world."





“The stream flow is completely changed. The vegetation has changed. It’s all mud, buffalo piles and denuded areas that once were thriving springs and runoff from the streams.”

Hodgson was also inspired by socialite-turned-yucca-hunter Susan Delano McKelvey, as well as Elzada Clover and Lois Jotter, who in 1938 became the first non-native women to make the harrowing journey through the Grand Canyon on the Colorado River and to scientifically collect and document the Canyon’s plants.

As the Garden’s senior research botanist, Hodgson has continued these wild women’s adventures—occasionally shooting the Colorado River’s rapids or rappelling down Canyon cliffs as she sleuths out rare species. Hodgson knew that spending her life hiking through searing heat to collect razor-sharp plants in the crevices of daunting landscapes would be difficult. But, she says, “I love challenges. And I knew there was a need for it. Some of us have always believed that the plants in the Canyon had been overlooked ... so when I see a need like that, especially in a beautiful place, I’m going for it.”

Hodgson has collected nearly 32,000 specimens for the Garden’s herbarium and discovered eight new species. She suspects several more species that are collected will be described as new in the near future.


One notable discovery was *Agave phillipsiana*, which was first found by Collom as she hiked through the Canyon. It was misidentified as another species Hodgson knew did not grow in the area. Prompted by a tip from botanist Arthur Phillips, III, Hodgson investigated a cluster of the agaves sprouting up near an archaeological site at Deer Creek. She knew instantly it was a new species, and she suspected it was domesticated by farmers before the arrival of Columbus. Many experts at the time didn’t believe pre-Columbian farmers in the region were domesticating agaves, but Hodgson says this large, sweet plant was “my smoking gun.”

Thanks to Hodgson’s work with Garden research botanist Andrew Salywon—both in the field and in the Garden’s molecular lab—we now know agaves were extensively cultivated in Arizona. DNA evidence supports the fact that *A. phillipsiana* and other newly described domesticates are distinct species, and provides valuable clues to their relationship with other agaves and how they arose.

In addition to studying plants, Hodgson, her colleagues and citizen scientists are monitoring the Grand Canyon’s natural springs, which she calls “the lifeblood of the Canyon.”



“We’re in a position



Springs make up less than 0.01% of the national park's landscape, yet these rivulets of biodiversity house 500 times more species than the surrounding desert. Each one is like an island, fostering its own ecosystem. Unfortunately, the springs are threatened by groundwater pumping, uranium mining, long-term aridification and the estimated 600 to 1,000 bison that tromp around the North Rim. "When I went this summer, I was absolutely floored by the damage the bison are causing," Hodgson says. "The stream flow is completely changed. The vegetation has changed. It's all mud, buffalo piles and denuded areas that once were thriving springs and runoff from the streams."

Through the Grand Canyon Conservancy, Hodgson and hydroecologist Steve Monroe lead trips with citizen scientists to gather hydrologic data on the springs and collect plant specimens. This summer, participants measured the effect of a modest, recent bison reduction program.

Citizen science has great value for both the Canyon and the wider community, Monroe says. "This is a way for people to reach out and become involved directly, and in doing that, they become more informed, and become scientists

themselves. So they can help gather information [independently], and they can help inform the broader population about the value of springs in the Grand Canyon."

The Canyon and other national parks and monuments are vital refuges of genetic biodiversity, Hodgson says. Therefore, it is critical to discover what species exist in these places and to gather scientific data in order to protect them. That is why collaborations between the Garden, the national park, Native American tribes, other researchers and citizen scientists are so important.

"We're in a position where we can help," Hodgson says. "We have the ability to do the science. We have the researchers. We have the collections. We are growing out plants. We have population geneticists. We have a volunteer corps. So we have that foundation from which we can help in major conservation efforts in any place, and certainly in the Grand Canyon."



on where we can help...

IS THE CURRENT DROUGHT ONLY WATER SUPPLY PROBLEM?

BY PAUL HIRT

Senior Sustainability Scholar, Arizona State University

If you were in Arizona this past summer, you may have experienced what some now call our "nonsoon" season—no monsoon. In 2019, most of northern Arizona was far drier than normal. Phoenix had its third driest monsoon in 73 years of record keeping; Prescott had its ninth driest monsoon; Flagstaff won the dubious prize of having the driest monsoon ever recorded. Southern Arizona counties did better but only because of an anomalous incursion of late September rainfall from several tropical depressions.

This is not an isolated bad year for precipitation. The entire Southwest has been in a two-decade long dry spell that ranks as one of the longest droughts in the region's history. In only three of the past 20 years did Arizona experience "normal" precipitation. Ominously, both our summer rains and our winter rains have declined.

Is the current drought in Arizona simply one of our naturally recurring dry spells or a more persistent consequence of climate change—a new normal? Time will tell, but climatologists are warning us to prepare for a much warmer and drier future.

Drought directly reduces the annual flow of our rivers and streams, which are Arizona's only renewable water supply. To enhance resilience, the federal government built dozens of dams on Southwestern rivers during the 20th century, storing tens of millions of acre-feet of water in reservoirs as a buffer during times of drought. Over the last century, a normal drought would last only three to five years, allowing our reservoirs to easily make up for the deficit during those dry spells. But the persistent drought since 2000 has been a game-changer.



CURRENT TOUR PROBLEM?

In 1999 the Southwest's two largest storage reservoirs—Lakes Mead and Powell on the Colorado River—were 98% full. They have never been even close to full since then and may never be full again in our lifetimes. The drop in reservoir levels after 2000 was so rapid and unexpected that Arizona, California and Nevada had to quickly hammer out a contingency plan they called the “Colorado River Interim Guidelines for Lower Basin Shortages,” signed into law in 2007. Even that document proved inadequate as the drought persisted and the reservoirs continued to decline.

By 2015, it was clear that even more drastic action was required to keep Lake Mead from falling to dead pool. After years of wrangling, the seven basin states that share the Colorado River agreed to a new, stricter Drought Contingency Plan (DCP) confirmed by an Act of Congress in early 2019.

Many water managers and policy makers praise this agreement as historic, but it is only a partial temporary fix that simply determines who loses how much water when Lake Mead's reservoir drops below specific elevations.

Arizona has already lost 192,000 acre-feet of its Colorado River allocation, because Lake Mead is below 1,090-foot elevation. If the lake drops below 1,075 foot elevation, Arizona will lose a little over half a million acre-feet of Colorado River water—virtually all of it coming out of the CAP Canal that serves metro Phoenix and Tucson. When running at full capacity, the CAP Canal carries 1.6 million acre-feet of water annually to central and southern Arizona. So a third of our renewable water supply is currently at risk.

The elevation of Lake Mead has been hovering near 1,075 since 2015 and has remained above that triggering elevation only because the feds, states, tribes and Mexico have all voluntarily left some water in the reservoir to keep it above 1,075. Even with these conservation measures, most hydrologists expect Lake Mead to drop below 1,075 in 2022. Nearly everyone expected Mead to drop to 1,075 this year. But we had an exceptionally good year of snowpack in the Colorado Rockies, which sent a lot of runoff into Lake Powell this spring and summer, postponing the reckoning for a couple years.

Our water supply in Arizona is a combination of surface water and groundwater. Some communities have access to the former—some to the latter, some to both. The vast majority of our groundwater aquifer is not renewable in any meaningful sense. It's like a savings account. When it's pumped out it's gone. Arizonans have been extracting groundwater for nearly a century with only a small fraction being replenished. In some groundwater basins, water levels have dropped by 300 to 400 feet, making water pumping ever more difficult and expensive and increasing our long-term sustainability challenges.

Concerned about groundwater overdraft, the Arizona legislature passed the Groundwater Management Act (GMA) in 1980, mandating conservation planning to try to get to "Safe Yield" of groundwater by 2025. The GMA also required new housing developments to show that they had a 100-Year Assured Water Supply. These laudable goals unfortunately have often been ignored or circumvented. After 40 years of implementation, we are still unable to meet the fundamental goals of the GMA.

Both groundwater and surface water supplies in Arizona are limited and declining, requiring our full attention and care. Both are deeply interconnected, too. Pumping water from the aquifer in a river valley can reduce the flow of the river, even dry it up completely. Conversely, the only location where groundwater recharge naturally occurs is in the alluvium along river valleys. Without groundwater there are no flowing rivers; without rivers there is no groundwater replenishment.

One of the main strategies of water managers in the state during times of drought is to increase groundwater pumping to compensate for the decline of surface water supplies.



LAKE POWELL



This is what SRP does for its customers in Maricopa County, but that's only sustainable if droughts are temporary and river flows return to expected levels.

Similarly, Arizona's 2019 Drought Contingency Plan allocated tens of millions of Arizona taxpayer dollars to drill new high-capacity wells to pump groundwater for Pinal County farmers who are losing their access to CAP water from the Colorado River. While that may be a short-term solution for Pinal farmers, it exacerbates our long-term sustainability challenge.

What's the long-term solution? Demand management—for more than 100 years Arizona leaders have adopted creative, expensive and often environmentally destructive “supply side” solutions. We've built dams, reservoirs, canals, pumps and pipelines to bring water from one place to another. When we faced scarcity, we sought to increase the supply.

But that's only one side of the coin. Managing our water demand is the other side. There is no longer any unclaimed, unused water available for acquisition and transfer. Besides, we get the most bang for the buck with conservation and efficiency programs. It is time to manage ourselves as expertly and assertively as we have managed water supplies.

To reach sustainable water use, we need to reduce the amount of water we pump from aquifers by at least two-thirds and we need to get used to having about 20% less water flowing in our rivers. That will take a lot of effort and will affect our lives, landscapes and businesses in significant ways. But it is certainly doable. We have to change our water culture to focus not on “development” but on sustainability and justice—ensuring that everyone has access to a minimum amount of clean water and that future generations will have as much opportunity as the present.

One important caveat, however: in our effort to squeeze ever greater efficiencies from our water supply/demand system, we must remember that we are not the only species on the planet that relies on fresh, clean water. We cannot capture and consume every drop for ourselves. Our health, our quality of life and our moral compass requires that we take into account the entire biotic world when we make decisions about managing natural resources. Once again, this underscores the importance of managing our own demands.



REDUCE YOUR WATER FOOTPRINT



BY TINA WILSON

One of the most frequently asked questions that the Garden receives is related to water and how we use it. Reducing our water footprint and ensuring the plants we are entrusted to care for are growing and thriving are priorities. Our work in water conservation is never done, and our staff is always exploring new ways to save one of our most precious resources. Technology could provide solutions to help advance water conservation at the Garden.

The horticulture team is in the process of evaluating our irrigation methods and how smart technology could be integrated to help care for the plant collections and displays in the Garden and the *Hazel Hare* Center for Plant Science.

Smart technology platforms within the industry vary depending on what you want to accomplish and what types of plants you are cultivating. The Garden is exploring a number of platforms that could allow us to manage watering schedules based on weather conditions, send automated alerts and alarms for mechanical failures, and create minute-by-minute reports on water usage, remote diagnostics and so much more.

In addition, horticulture is exploring a system that uses wireless sensors to measure soil moisture, salinity and soil temperature. These types of platforms can generate real-time data for Garden staff to analyze and make decisions to optimize plant care and water-use for the living collections.

You too can make an impact at home by following these landscaping tips.

1. CHOOSE PLANTS WISELY



Native plants should be used for landscaping purposes, because they are adapted to thrive and grow with less water. That creates a solid foundation for working with a plant palette that naturally uses very little water. Here are a few suggested winter plantings that will thrive:

- *Asclepias subulata* – Desert Milkweed
- *Sphaeralcea ambigua* – Globemallow
- *Cordia boissieri* – Texas Olive

2. LOCATION IS KEY



Knowing your landscape and how it behaves can assist you in making the best decisions. Before you plant, answer these questions:

- How much sunlight does this area get in the morning and afternoon?
- What type of soil profile does it have—compacted, well-draining, etc.
- When it rains, do you get standing water? If so, for how long?
- Do you have enough space for plants to grow as they mature to their full size?
- What type of watering system do you have, and can it support multiple plant forms? For example cactus, trees and vegetables require different watering amounts and schedules.

3. BE WATER-WISE



Evaluate your current watering system, especially when you are renovating your landscape. These easy tricks will reduce your water footprint:

- Avoid hand watering with a hose and sprinkler for your in ground plants; you have limited control over how much water is being used and if the water is actually hitting the root zones of your plants with the correct amount.
- Adjust your watering schedules seasonally. For winter, we suggest for established plants (plants in the ground for more than three years) turn off your irrigation system, especially if we receive winter rain arrives. If recently planted, deep water at least every 14 to 21 days if it does not rain.
- Consult with an irrigation specialist to review and update your system and layout to ensure you are using the most water-conscience methods to meet your plants' needs.

While some of these tips can be implemented today, we can all begin to plan for the future. This winter, in our sustainable desert landscape certificate course, we explore drip irrigation and maintenance. This Desert Landscape School class focuses on hands-on learning and on how to design and install your very own drip irrigation system. We also explore the various ways to water harvest through passive systems (berms, mounding, basins) or active systems such as graywater.

For more information, visit dbg.org/learn/desert-landscape-school/.



A BATCH MADE IN HEAVEN

By Clare Hahne



*A Chat with
Arizona
Wilderness
Brewery Co.*



Co-owners Patrick Ware (left) and Jonathan Buford

One look at the Arizona's rolling desert terrain is all it takes to fall in love with its natural beauty. That is all it took to inspire the creators of Arizona Wilderness Brewery Co.

The idea for the company began on a backpacking trip in Arizona, when the founders wanted to combine their entrepreneurial spirit with their love for the Grand Canyon state. Owner and founder Jonathan Buford says their beer actually tastes like Arizona, too, because all their beer's barley is grown and malted in the Verde Valley, which is about 100 miles north of Phoenix.

"We always source raw ingredients from Arizona—citrus, dates, honey, herbs and spices, prickly pear and many more," says Buford. "We love supporting the diversity of this state."

From the get-go, these Arizona flavors have impressed worldwide. Shortly after opening, Arizona Wilderness Brewery Co. garnered international attention when it was ranked as the Best New Brewery by Ratebeer.com, beating out brewers from Ireland, Austria, San Diego and more for the coveted number-one spot.

But this isn't just good-tasting beer—it is feel-good beer. Arizona Wilderness Brewery Co. partners with Sinagua Malt, an Arizona benefit corporation created to provide a market solution for declining rivers and streams. They work with the farmers to grow low-water-yield crops like barley instead of the high-water-use crops, including cotton, alfalfa and corn.

"We have learned that a major portion of water issues start with farms upstream," says Buford. "We continually work to understand their needs and ensure they work on drip systems and low-water-intensive crops."

These steps prove to be making an impact too. Buford says Sinagua Malt saved 50 million gallons

of water during the low-water-reserve summer season, and this was simply tied to shifting what the farmers grow.

"We continually strive to support Arizona and to make low-impact decisions that benefit the state," says Buford.

With a second location in Downtown Phoenix under its belt and these impressive conservation partnerships and sustainable practices in their toolkit, Arizona Wilderness Brewery Co. is ready to share their story and beer with Garden guests.

Arizona Wilderness Brewery Co. will be serving up a selection of their beers at Devour Culinary Classic this year for the first time.

"We believe we've earned our seat at the table to represent this state that we love," says Buford. "We want to build the excitement and add value from our own experiences. Honestly, we want to share our love of this state and influence people's decisions to choose local first."

Arizona Wilderness Brewery Co.'s' next partnership is one that Garden-goers can get excited about. The brewery is creating a Garden-inspired beer, using indigenous desert ingredients. Arizona Wilderness will begin serving the Garden beer at their locations and Garden events, including Think & Drink and Devour Culinary Classic.

To learn more about Think & Drink and Devour Culinary Classic or to purchase your tickets, visit dbg.org.



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MISSION

The Garden's commitment to the community is to advance excellence in education, research, exhibition and conservation of desert plants of the world with emphasis on the Sonoran Desert.

We will ensure that the Garden is always a compelling attraction that brings to life the many wonders of the desert.



Partial funding provided by the Phoenix Office of Arts and Culture through appropriations from the Phoenix City Council.

THINK & DRINK

THU, JULY 12, 7:00 PM - 9:00 PM
7-9000 GARDEN

Inspired by **Wild Rising by Cracking Art**, listen to talks and discussions from experts, scholars and industry professionals, as they share their insight about topical issues. Afterward, mingle with friends over drinks, music and yard games.

THINK & DRINK DESERT BOTANICAL GARDEN

